User's Manual

PG-FP5 V2.12
Flash Memory Programmer
User's Manual: Common

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PREFACE

Thank you for purchasing the PG-FP5 flash memory programmer. The PG-FP5 is a flash memory programmer for Renesas Electronics microcontrollers.
All components of the PG-FP5 are listed under “1.4 Package Components”. If you have any questions about the PG-FP5, contact your local distributor.
The manuals relevant to usage of the PG-FP5 are listed below. The manuals for your product consist of two volumes; a common part and a part for the corresponding MCUs. Be sure to read both volumes before using the PG-FP5. You can download the latest manuals from the Renesas Tools homepage (http://www.renesas.com/pg_fp5).

Related manuals

Document name	Document number
PG-FP5 V2.12 Flash Memory Programmer User's Manual Common	This manual
PG-FP5 V2.12 Flash Memory Programmer User's Manual RL78, 78K, V850, RX100, RX200, RX600 (Except RX64x), R8C, SH	R20UT2923E
PG-FP5 V2.12 Flash Memory Programmer User's Manual RH850, RX64x	R20UT2924E

Important

Before using this product, be sure to read this user's manual carefully.
Keep this user's manual, and refer to it when you have questions about this product.

Purpose of use of the product:

This product is a device to support the development of systems that uses Renesas Electronics microcontrollers. This product is a tool that erases, writes and verifies programs on a Renesas Electronics on-chip flash memory microcontroller on the target system.

Be sure to use this product correctly according to said purpose of use. Please avoid using this product other than for its intended purpose of use.

For those who use this product:

This product can only be used by those who have carefully read the user's manual and know how to use it.

Use of this product requires basic knowledge of electric circuits, logical circuits, and MCUs.

When using this product:

(1) This product is a development-support unit for use in your program development and evaluation stages. When a program you have finished developing is to be incorporated in a mass-produced product, the judgment as to whether it can be put to practical use is entirely your own responsibility, and should be based on evaluation of the device on which it is installed and other experiments.

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(5) Renesas Electronics Corporation cannot predict all possible situations and possible cases of misuse that carry a potential for danger. Therefore, the warnings in this user's manual and the warning labels attached to this product do not necessarily cover all such possible situations and cases. The customer is responsible for correctly and safely using this product.

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Usage restrictions:

This product has been developed as a means of supporting system development by users. Therefore, do not use it as an embedded device in other equipment. Also, do not use it to develop systems or equipment for use in the following fields.

(1) Transportation and vehicular
(2) Medical (equipment that has an involvement in human life)
(3) Aerospace
(4) Nuclear power control
(5) Undersea repeaters

If you are considering the use of this product for one of the above purposes, please be sure to consult your local distributor.

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Precautions for Safety

This chapter describes the precautions which should be taken in order to use this product safely and properly. Be sure to read and understand this chapter before using this product.
Contact us if you have any questions about the precautions described here.
This chapter describes the precautions which should be taken in order to use this product safely and properly. Be sure to read this chapter before using this product.

⚠WARNING	WARNING indicates a potentially dangerous situation that will cause death or heavy wound unless it is avoided.
⚠CAUTION	CAUTION indicates a potentially dangerous situation that will cause a slight injury or a medium-degree injury or property damage unless it is avoided.

In addition to the two above, the following are also used as appropriate.

△ means WARNING or CAUTION.
Example:

CAUTION AGAINST AN ELECTRIC SHOCK

⃠ means PROHIBITION.
Example:

DISASSEMBLY PROHIBITED

● means A FORCIBLE ACTION.
Example:

UNPLUG THE POWER CABLE FROM THE RECEPTACLE.

⚠ WARNING

Warnings for AC Power Supply:

If the AC power cable of the optional AC adapter does not fit the receptacle, do not alter the AC power cable and do not plug it forcibly. Failure to comply may cause electric shock and/or fire.

Use an AC power cable which complies with the safety standard of the country.

Do not touch the plug of the AC power cable when your hands are wet. This may cause electric shock.

This product is connected signal ground with frame ground. If yours developing product is transform-less (not having isolation transformer of AC power), this may cause electric shock. Also, this may give an un-repairable damage to this product and yours developing product.
While developing, connect AC power of the product to commercial power through isolation transformer in order to avoid these dangers.

If other equipment is connected to the same branch circuit, care should be taken not to overload the circuit.

When installing this equipment, insure that a reliable ground connection is maintained.

If you smell a strange odor, hear an unusual sound, or see smoke coming from this product , then disconnect power immediately by unplugging the AC power cable from the outlet.
Do not use this as it is because of the danger of electric shock and/or fire. In this case, contact your local distributor.

Before setting up this product and connecting it to other devices, turn off power or remove a power cable to prevent injury or product damage.

Warnings to Be Taken for Handling:

Do not modify this product. Personal injury due to electric shock may occur if this product is modified. Modifying the product will void your warranty.

Warning for Installation:

Do not set this product in water or areas of high humidity. Make sure that the product does not get wet. Spilling water or some other liquid into the product may cause un-repairable damage.

Warning for Use temperature:

Care should be taken that a maximum ambient temperature is not exceeded when this product is to be used.

⚠CAUTION

Cautions to Be Taken for the AC Adapter:

Use only the optional dedicated AC adapter for this product.

Do not use the AC adapter for other equipment.

Cautions to Be Taken for Turning On the Power:

Observe the following specified order for the power-on and power-off procedures of the user system and this product. Doing otherwise may cause the user system or this product to fail.

Power ON: (1) This product power ON, (2) User system power ON, (3) Start programming GUI

Power OFF: (1) Exit programming GUI, (2) User system power OFF, (3) This product power OFF

Cautions to Be Taken for Handling This Product:

Use caution when handling the product. Be careful not to apply a mechanical shock.

Do not touch the connector pins of this product and the target MCU connector pins directly. Static electricity may damage the internal circuits.

When attaching and removing the cable, hold the plug of the cable and do not touch the cable. Do not pull this product by the communications interface cable or the flexible cable. And, excessive flexing or force may break conductors.

Do not use inch-size screws for this equipment. The screws used in this equipment are all ISO (meter-size) type screws. When replacing screws, use same type screws as equipped before.

Note on Transporting the Product:

When sending your product for repair, use the packing box and cushioning material supplied with the product when it was delivered to you and specify caution in handling (handling as precision equipment). If packing of your product is not complete, it may be damaged during transportation. When you pack your product in a bag, make sure to use the conductive plastic bag supplied with the product (usually a blue bag). If you use a different bag, it may lead to further trouble with your product due to static electricity.

⚠CAUTION

Caution to Be Taken for System Malfunctions:

If this product malfunctions because of interference like external noise, do the following to remedy the trouble.

(1) Exit the programming GUI, and shut OFF this product and the user system.

(2) After a lapse of 10 seconds, turn ON the power of this product and the user system again, then launch the programming GUI.

Caution to Be Taken for Disposal:

Penalties may be applicable for incorrect disposal of this waste, in accordance with your national legislation.

European Union regulatory notices:

The WEEE (Waste Electrical and Electronic Equipment) regulations put responsibilities on producers for the collection and recycling or disposal of electrical and electronic waste. Return of WEEE under these regulations is applicable in the European Union only. This equipment (including all accessories) is not intended for household use. After use the equipment cannot be disposed of as household waste, and the WEEE must be treated, recycled and disposed of in an environmentally sound manner.

Renesas Electronics Europe GmbH can take back end of life equipment, register for this service at “http://www.renesas.eu/weee”.

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User Registration

For more information about user registration, please contact your local distributor.

Terminology

The meanings of the terms used in FP5 manual are as follows.

(1)

Term	Meaning.
FP5	Abbreviation of the flash memory programmer PG-FP5
Programming GUI	Windows application to operate FP5 using programming GUI
Target device	Renesas Electronics on-chip flash memory microcontroller
Target system	User-designed board on which target device is mounted
Program adaptor[Note1]	Conversion adaptor to write programs to target device
PR5 file	Abbreviation of the parameter file for the PG-FP5. The parameter file has parameter information required to write in the flash memory of the target microcontroller. The extension of the file is "*.pr5". Do not change the data in the file. If the file is changed, operation of the FP5 is not guaranteed.
ESF file	Abbreviation of the setting file for the PG-FP5. The setting file stores information required for writing. For the FP5, settings regarding the writing environment such as target devices and operation option are stored. The extension of the file is "*.esf". Do not change the data in the file. If the file is changed, operation of the FP5 is not guaranteed. Note Use ESF files that correspond to the version of the generated FP5. An error occurs when the FP5 reads files from other FP5 versions. In such cases, create new ESF files.
Program file	The program file is the program written to the microcontroller. For the FP5, the following file formats are supported. <RL78, 78K, V850> a. Intel HEX format HEX file b. Intel HEX format HCUHEX file c. Motorola S format HEX file d. Motorola S format HCUHEX file <RX family, R8C family, SuperH family> a. Intel HEX format HEX file b. Motorola S format HEX file c. DDI file Note Addresses may not be consecutive, but they must be in ascending order. Free space will be filled with "FFH" upon download to the FP5. When download is performed with the programming GUI, it has the function to sort addresses in ascending order. Note For details on the formats, refer to "How to Order ROM Code: Information (C10302E)." Note The program file name does not support 2-byte characters.
Flash options[*3]	General term for microcontroller operation settings such as security settings
Option data[*3]	General term for flash options, wide-voltage mode, and full-speed mode[Note2]
HEX file	A HEX file of Intel HEX format type or Motorola HEX format type without option data
HCUHEX file	A HEX file that integrates option data into a HEX file generated by using the HEX Consolidation Utility (HCU), which is used to generate ROM code for flash memory products whose flash memories are pre-written by Renesas Electronics
DDI file	File in which data in multiple flash areas generated by Flash Development Toolkit is integrated.
Flash Development Toolkit	Flash Development Toolkit is a software to write in the flash memory of the Renesas microcontroller with on-chip flash. For details, refer to the following websites. http://www.renesas.com/fdt
INI file	File in which settings of the programming GUI are stored. The file is saved when the programming GUI is closed. The file name is "FP5.ini".
OCD security ID[*3]	Abbreviation of the on-chip debug security ID. Security function for on-chip debugging of the microcontroller.

(2)

Term	Meaning.
ID code*3	Authentication code used in the ID authentication mode and in OCD. For details, refer to the user's manual of the microcontroller.
Lock bit*3	One of the security functions of the microcontroller. For details, refer to the user's manual of the microcontroller.
Signature	Information about the microcontroller (microcontroller name, firmware version)
FINE	Supports FINE of the RX100 and RX200.
ID authentication mode	One of the security functions of the microcontroller. For details, refer to the user's manual of the microcontroller.
Command protection mode	One of the security functions of the microcontroller. For details, refer to the user's manual of the microcontroller.
OTP	One of the security functions of the microcontroller. For details, refer to the user's manual of the microcontroller.
OFS	One of the security functions of the microcontroller. For details, refer to the user's manual of the microcontroller.

Notes 1. The program adaptor (FA-xxxx) is a product of Naito Densei Machida Mfg. Co., Ltd.
If you have any questions about the FA adaptor board, contact Naito Densei Machida Mfg. Co., Ltd. (Tel: +81-42-750-4172).
2. The functions that can be used differ depending on the target device.
3. Refer to the user's manual of the target device for more information.

Term replacement

When the RX100 is used, some terms in this manual should be replaced as shown in the table below.

Term	Meaning.
Flash shield window	Area protection
Get Flash options	Access window read
Set Security	Access window program

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1. OVERVIEW

The FP5 is a tool that erases, writes and verifies programs on a Renesas Electronics on-chip flash memory microcontroller on the target system.

1.1. Features

- Compatible with remote operation for FP5 from an external control device
- Compatible with communications commands operated by the FP5 command through RS-232C
- The customization and security settings of the FP5 unit can be changed with the FP5 Manager function
- Supports on-chip 2-power-supply flash memory microcontrollers and single-power-supply on-chip flash memory microcontrollers
- Supports flash memory programming through the programming GUI using the host PC (programming GUI operation) and operation in standalone (standalone operation)
- Supports on-board programming through which programs are written with the target device mounted on the target system
- Program files can be saved in the 16 MB flash memory in the FP5 (divided by 2, in 10 MB and 6 MB units, divided by 4, in 4 MB units or divided by 8, in 2 MB units)
- Device-specific parameters required for programming can be saved in the FP5 internal flash memory by using the parameter file (PR5 file), together with programming settings (ESF file).
- Multiple program files, PR5 files and ESF files can be saved
- Supports CSI, CSI + HS, UART, I^2C and PORT as target device interfaces
- Can supply V_{DD} and clocks to the target device
- Supports USB interface and serial interface (RS-232C) as a host interface
- Supports self-testing function

1.2. Writing Quality

Thoroughly confirm, verify and evaluate the following points before using the FP5, in order to improve the writing quality.

- Design circuits as described in the user's manual for the target device and the FP5.
- Use the device and the FP5 as described in the user's manual for each product.
- The power supplied to the target device is stable.

1.3. Supported Devices

The FP5 supports on-chip 2-power-supply flash memory microcontrollers and on-chip single-power-supply flash memory microcontrollers.
FP5 parameter files (PR5 files) corresponding to the supported devices are posted on the following website.
URLs

- Except for Europe area: http://www.renesas.com/pg_fp5
- For Europe area: http://www.renesas.eu/update → Section PG-FP5-EE

1.4. Package Components

The package of this product includes the items listed below. Check the items. Note that the package for the PG-FP5 does not include an AC adaptor. Purchase an adaptor separately (refer to 1.8 AC Adaptors for PG-FP5).

Table 1.1 Package Components

Item	Quantity.
List of Package	1
PG-FP5	1
USB cable	1
Serial cable	1
Target cable (16pin type)	1
Target cable (14pin type)	1
GND cable	1
PG-FP5 Setup Manual [Japanese / English]	1
Table of Toxic and Hazardous Substance and Elements	1
EMC regulation (VCCI, FCC)	1

1.5. FP5 System Overview

The FP5 system overview is shown in the following diagrams.

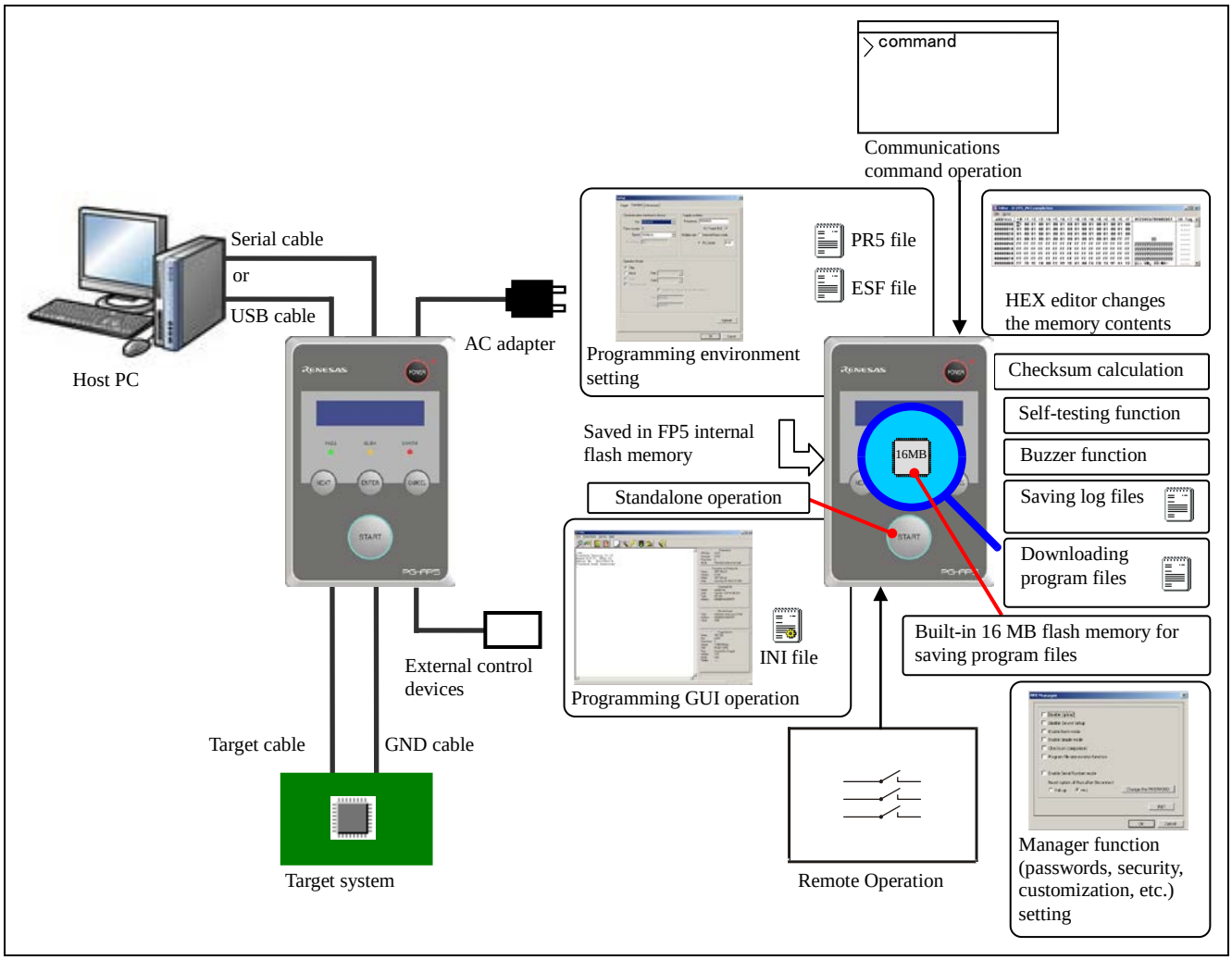


Figure 1.1 FP5 Connection Image

<Programming GUI operation>
The following operations can be performed with the programming GUI. For USB connection, the USB driver must be installed. The settings on the host PC are saved in an INI file.

- ESF file creation
- Downloading program files, PR5 files and ESF files (saved into FP5 internal flash memory)
- Saving log files
- Editing program files (by using HEX editor)
- Checksum calculation
- Programming command execution
- Execution of self-testing function
- Manager function (passwords, security, customization, etc.) setting

<Standalone operation>
The FP5 can operate in standalone mode, whereby commands such as [Erase], [Program] and [Autoprocedure(E.P.)] can be executed without using the host PC. It is suitable for use in production lines during mass production or upgrading programs in the field.
The following can be performed in standalone operation.

- Execute programming command
- Confirm contents of each downloaded file

<Communications Command Operation>
FP5 can be operated by communications commands from the host PC.

<Remote Operation>
Writing and PASS/ERROR displays can be operated and confirmed from external control devices.

<FP5 internal flash memory>
The FP5 has a 16 MB flash memory area for saving program files. This memory area can be used as two programming areas of 10 MB and 6 MB (Area 0 to Area 1), four 4 MB programming areas (Area 0 to Area 3), or eight independent 2 MB programming areas (Area 0 to Area 7). Program files can be downloaded to each programming area, and which file, PR5 or ESF, is to be saved is selectable in programming area units. That is, files can be individually downloaded in each programming area, and the area used can also be selected individually. Program files, PR5 files and ESF files are retained even if the FP5 power is turned off.
Downloaded data will be self-tested for accuracy when the FP5 is started, during downloads and when programming areas are changed.

<Notification function>
When Autoprocedure (E.P.) is executed, whether execution is completed normally is indicated by beeps.

<Checksum calculation>
Checksum calculation for the download program files is possible.

1.6. Operating Environment

1.6.1. Hardware environment

(1) Host PCs

- PC/AT compatible
- Equipped with USB 2.0 ports (compatible with 1.1)
- Equipped with RS-232C serial ports

1.6.2. Software environment

(1) OS (either of the following)

- Windows Vista (32-bit edition, 64-bit edition)
- Windows 7 (32-bit edition, 64-bit edition)
- Windows 8/8.1 (32-bit edition, 64-bit edition)
- Microsoft .NET Framework 4
- Microsoft Visual C++ 2010 Redistributable Package (x86)
- Internet Explorer 6.0 or later

1.7. Hardware Specifications

Table 1.2 Hardware Specifications

Hardware	Items	Specifications
FP5 main unit	Operating power supply	Supplied via AC adaptor (15 V)
	Operating environment ccondition	Temperature: ±0 to +40°C Humidity: 10% to 80% RH (no condensation)
	Storage environment ccondition	Temperature: −15 to +60°C Humidity: 10% to 80% RH (no condensation)
	Package size	140 × 90 × 30 mm (not including projections)
	Weight	Approximately 230 g
	Internal flash memory	Program file save area (16 MB) Other (PR5 file save area, ESF file saved area, firmware area, and FPGA area)
	Operation mode	Programming GUI operation, standalone operation, remote operation, communication command operation
AC adaptor	Specifications	AC adaptors used in each region Note 3
Host PC interface	Target host PC	PC/AT compatible
	USB connector	Type mini-B, USB 2.0 (compatible with 1.1)
	USB cable	Approximately 2 m
	Serial connector	9-pin D-SUB male connector for RS-232C @ 9600, 19200, 38400, 57600, 115200 bps
	Serial cable	Approximately 3 m (cross cable)
Target interface Note 1	Target connector	Connector: 15-pin HD-SUB female connector Protected function: Internal over-voltage input protection circuit
	Target cable	Two cables: 16-pin type and 14-pin type. Cable length: Approximately 42 cm
	Power supply Note 2	1.2 to 5.5 V
	Power supply detection	Available
	CPU clock supply	1 MHz, 2 MHz, 4 MHz, 5 MHz, 6 MHz, 8 MHz, 9 MHz, 10 MHz, 12 MHz, 16 MHz, 20 MHz
	GND cable	Approximately 1 m
Remote interface	Remote connector	15-pin D-SUB female connector

Notes 1. The maximum communication speed in the interface may vary depending on the device and environment used.

2. V_{DD} for the target system is supplied for the purpose of supplying power to the target device through which writing is performed, so the specification cannot secure sufficient capacity to operate the target system. Use the power source on the target system when performing on-board programming.

3. The AC adaptor differs depending on the region where the product is being used. For details, see Table 1.3 AC Adaptors for PG-FP5 Used in Each Region. An AC adaptor is required when using the PG-FP5, so be sure to purchase an AC adaptor.

1.8. AC Adaptors for PG-FP5

The specifications of the AC adaptor for the PG-FP5 differ depending on the region where the product is being used. Be sure to use the appropriate AC adaptor for your region. Note that an AC adaptor is not included with the PG-FP5. The appropriate AC adaptor must be purchased separately.

Table 1.3 AC Adaptors for PG-FP5 Used in Each Region

Name	Region[Notes 1, 2]	Part Number[Note 3]
AC adaptor (sold separately)	Japan	QB-COMMON-PW-JP
	USA	QB-COMMON-PW-EA
	China	QB-COMMON-PW-CN
	Hong Kong	QB-COMMON-PW-HK
	Korea	QB-COMMON-PW-KR
	Singapore	QB-COMMON-PW-SG
	Chinese Taipei	QB-COMMON-PW-TW

Notes 1. The AC adaptor corresponding to the region from which the order was received will be shipped.
2. For regions other than those listed above, please contact a Renesas Electronics sales representative or distributor.
3. You can only order the AC adaptor that can be used in your region.

1.9. HCUHEX Files

HCUHEX files are files that are required when ordering flash memory products whose flash memories are pre-written by Renesas Electronics. HCUHEX files are generated by the HEX Consolidation Utility (HCU), after which they must be verified on a flash memory programmer before being submitted. The PG-FP5 handles HCUHEX files as master data, and can therefore be used to check the written data and the option data settings. HCUHEX files are supported in part of the RL78, 78K0, 78K0R, V850. If they are supported, it is described in the user's manual of the target microcontroller (the SH, RX, R8C, and RH850 do not support HCUHEX files). For details, see the functional descriptions in this manual. For more information about HCU, see the HCU user's manual or the manual of the target device. The following websites describe details about HCU.

- Websites
- Japanese version: http://japan.renesas.com/hcu

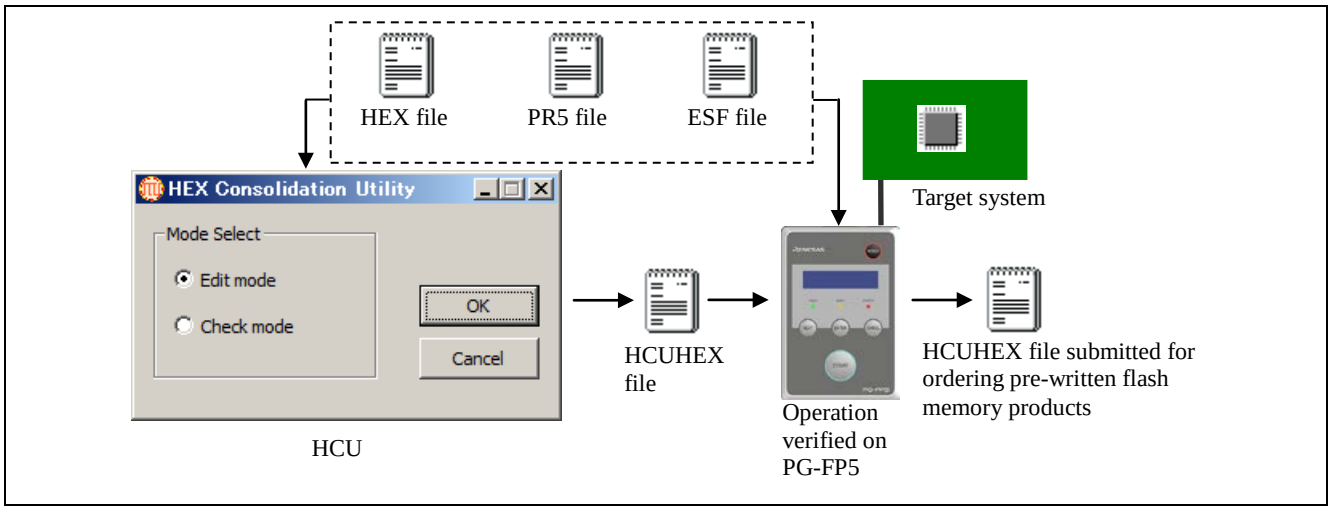


Figure 1.2 PG-FP5 Connection Diagram

1.10. Regulatory Compliance Notices

This equipment complies with the EMC protection requirements

WARNING

This is a ‘Class A’ (EN 55022: 1998) equipment. This equipment can cause radio frequency noise when used in the residential area. In such cases, the user/operator of the equipment may be required to take appropriate countermeasures under his responsibility.

EEDT-ST-001-11

CAUTION

This equipment should be handled like a CMOS semiconductor device. The user must take all precautions to avoid build-up of static electricity while working with this equipment. All test and measurement tool including the workbench must be grounded. The user/operator must be grounded using the wrist strap. The connectors and/or device pins should not be touched with bare hands.

EEDT-ST-004-10

For customers in the European Union only

Redemption of Waste Electrical and Electronic Equipment (WEEE) in accordance with legal regulations applicable in the European Union only: This equipment (including all accessories) is not intended for household use. After use the equipment cannot be disposed of as household waste. Renesas Electronics Europe GmbH offers to take back the equipment. All you need to do is register at http://www.renesas.eu/weee.

EMC regulation (VCCI, FCC)

Please read the following notes about EMC regulation before using.

電波障害自主規制について (JAPAN ONLY)

この装置は、クラスA情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。
この場合には使用者が適切な対策を講ずるよう要求されることがあります。

VCCI-A

About FCC

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense. Modifications not expressly approved by the manufacturer could void the user's authority to operated the equipment under FCC rules.

Notes When using this product, please use AC adapter (QB-COMMON-PW) which comply with the standard of VCCI and FCC.

2. HARDWARE CONFIGURATION

This chapter explains the hardware configuration.

2.1. System Configuration

The FP5 system configuration is as shown in the diagram below.

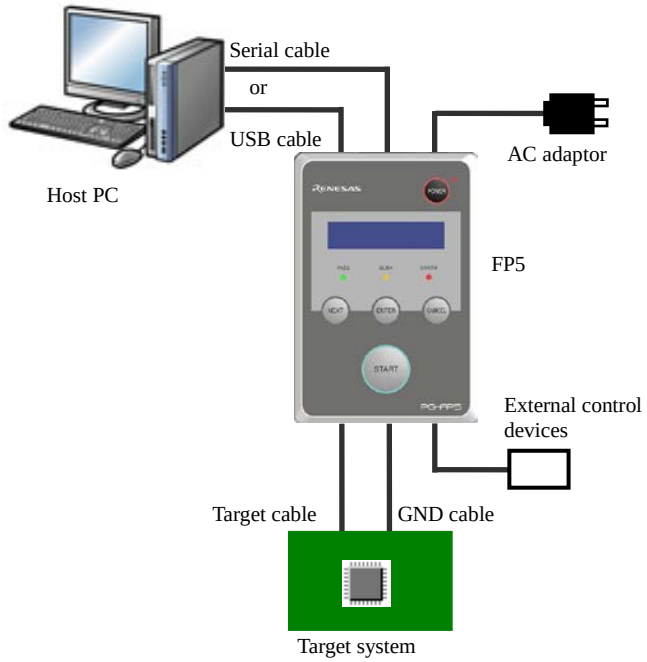


Figure 2.1 FP5 System Configuration

The FP5 is connected to the host PC via a serial cable or a USB cable. The FP5 is connected to the target system via a target cable and a GND cable. And the FP5 can be remote controlled by connecting the remote connector and external control device.

2.1.1. Host PC

A host PC is used to communicate with the FP5. The host PC must also be equipped with a serial port or a USB port.

2.1.2. Serial cable

Communication is established by using a serial cable to connect the host PC serial port and FP5 serial connector (RS-232C cross cable) connection. For details on the serial cable specifications, refer to 7 CONNECTORS AND CABLES

2.1.3. USB cable

Communication is established by connecting the host PC USB port and the FP5 USB connector (mini-B type) using a USB cable. For details on the USB cable specifications, refer to 7 CONNECTORS AND CABLES.

2.1.4. AC adaptor

Connect the FP5 power supply connector to the AC adaptor included with the FP5. The AC adaptor differs depending on the region where the product is being used. For details, see Table 1.3 AC Adaptors for PG-FP5 Used in Each Region. An AC adaptor is required when using the PG-FP5, so be sure to purchase an AC adaptor.

2.1.5. Target cable

A 16-pin connector or 14-pin connector is equipped on the tip of the target cable, which is connected to the target system or the program adaptor. For details on the target cable specifications, refer to 7 CONNECTORS AND CABLES.

2.1.6. GND cable

To reinforce the GND, use a GND cable to connect the FP5 GND connector and the signal GND of the target system or program adaptor. For details on the GND cable specifications, refer to 7 CONNECTORS AND CABLES.

Note The FP5 and target system may be damaged if the voltage between the FP5 GND and the target system GND is different. Use the GND cable to match the voltage before connecting the target cable.

2.1.7. Target system

The target system must be equipped with a device interface that complies with the target cable specifications. For details on the specifications, refer to 7 CONNECTORS AND CABLES, 8 NOTES ON TARGET SYSTEM DESIGN, and 9 SPECIFICATIONS OF TARGET INTERFACE CIRCUITS.

2.1.8. Program adaptor

The FP5 supports off-board programming through which programs are written via a program adaptor without mounting the target device onto the target system.

2.2. Names and Functions on Main Unit

This section describes the names and functions on the FP5 main unit.

2.2.1. FP5 control panel

Indicators and buttons are laid out on the FP5 top.

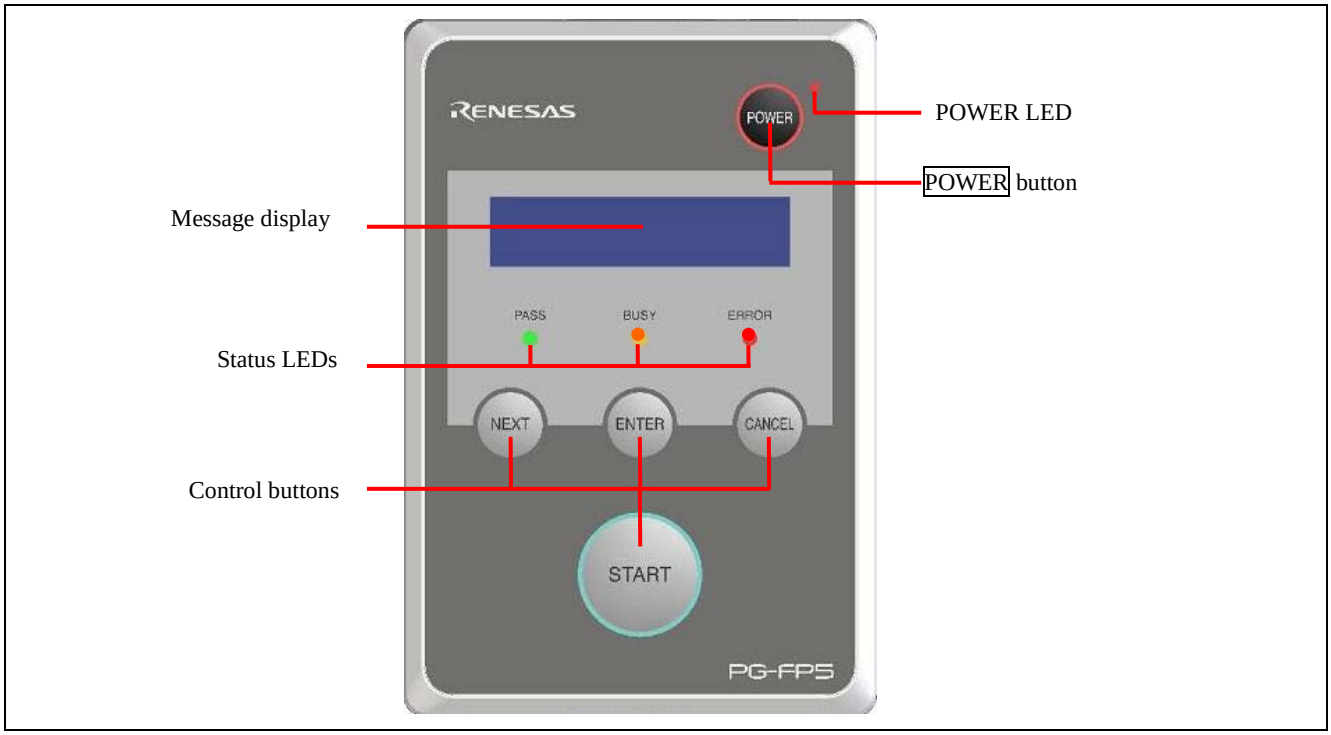


Figure 2.2 FP5 Top View <Control Panel>

(1) Indicators

- POWER LED — LED that displays the FP5 power status.
  A red LED is turned on when the FP5 is ON, and is turned off when the FP5 is OFF.
- Message display — An LCD display of 16 × 2-characters that indicates the operating mode or menus.
  It is mainly used when the FP5 operates in standalone mode.
- Status LEDs — LEDs that show the FP5 operating status.
  PASS (green LED turned on) indicates normal completion, BUSY (orange LED flashes) indicates processing in progress, and ERROR (red LED turned on) indicates abnormal completion.

(2) Buttons

- POWER button — Used to turn on/off the power to the FP5. Press this button longer (for about 1 minute) when turning on/off.
- NEXT button — Proceeds to the next menu item at the same level in sequence.
- ENTER button — Selects the item shown in the message display.
- CANCEL button — Cancels the current selection and returns to the previous menu item. The command currently running cannot be stopped, except for the [Read] command.
- START button — Executes the [Autoprocedure(E.P.)] command with a valid programming area setting.

Note The NEXT, ENTER, CANCEL and START buttons are mainly used in standalone mode.
When the FP5 Manager is used to switch to the bank mode or simple mode, the button functions and message display functions will change. Refer to each microcontroller edition 1.3.2 [FP5 Manager] command and 5 USAGE THE REMOTE CONNECTOR.

2.2.2. FP5 connectors

The power supply connector, serial connector and USB connector are laid out on the host interface side.
The target connector, GND connector and remote connector are laid out on the target connector side.

Figure 2.3 FP5 Top View <Connector>

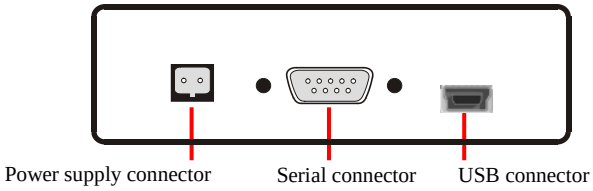


Figure 2.4 FP5 Host Interface Side

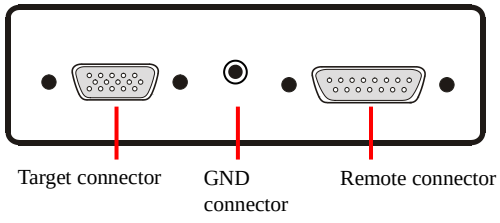


Figure 2.5 FP5 Target Connector Side

(1) Power supply connector

Connect the power supply connector to the AC adaptor included with the FP5. For details on the power supply connector specifications, refer to 7 CONNECTORS AND CABLES.

Note Do not use an AC adaptor other than that included with the PG-FP5.

(2) Serial connector

Communication is established by using a serial cable (RS-232C cross cable) connection to connect the host PC serial port and FP5 serial connector. The data transfer conditions are as follows.

- Data transfer speed: 9,600 bps, 19,200 bps, 38,400 bps, 57,600 bps, or 115,200 bps
- Data bit: 8 bits
- Parity: none
- Stop bit: 1 bit
- Flow control: hardware

The transfer speed is set to 9,600 bps by default, but it can be changed. For details on the serial connector specifications, refer to 7 CONNECTORS AND CABLES.

(3) USB connector

Communication is established by using a USB cable to connect the host PC USB port and the FP5 USB connector (mini-B type). This connector conforms with USB 2.0 standards. For details on the USB connector specifications, refer to 7 CONNECTORS AND CABLES.

(4) Target connector

Connect the target connector to the target system using the target cable for on-board programming. Connect the target connector to the program adaptor using the target cable for off-board programming. For details on the target connector specifications, refer to 7 CONNECTORS AND CABLES.

(5) GND connector

To reinforce the GND, connect the FP5 GND connector and the signal GND of the target system or program adaptor using a GND cable. For details on the GND connector specifications, refer to 7 CONNECTORS AND CABLES.

Note The FP5 and target system may be damaged if the voltage between the FP5 GND and the target system GND is different. Use the GND cable to match the voltage before connecting the target cable.

(6) Remote connector

The FP5 can be remote controlled by connecting the remote connector and external control device. For details on the Remote operation, refer to 5 USAGE THE REMOTE CONNECTOR, 7 CONNECTORS AND CABLES.

3. SOFTWARE INSTALLATION

This chapter explains the software installation.

3.1. Obtaining Software

Download the programming GUI, USB driver, and FP5 parameter file (PR5 file) from the following Renesas Electronics website.
URLs

- Except for Europe area: http://www.renesas.com/pg_fp5
- For Europe area: http://www.renesas.eu/update → Section PG-FP5-EE

Note Use of the latest version of software is recommended to assure the FP5 operation.

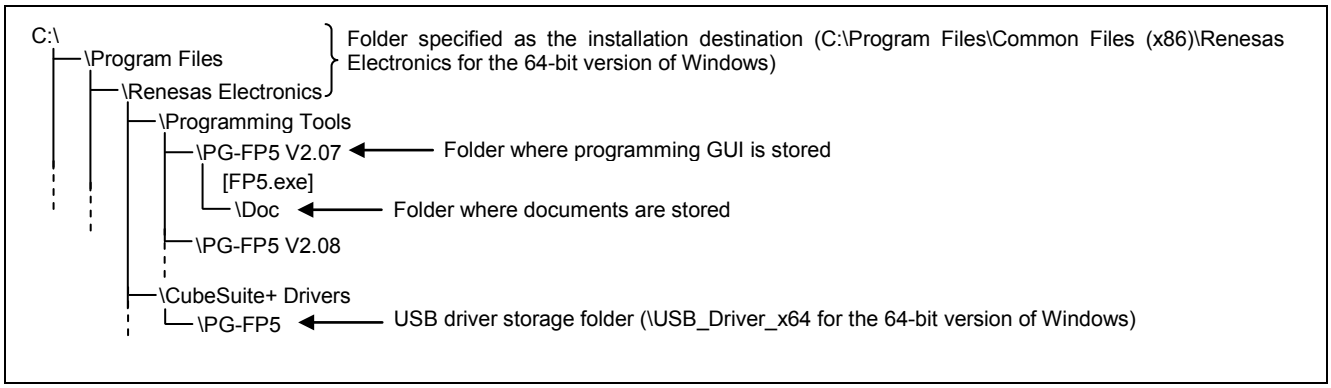
3.2. Installation

This section explains the installation procedure for the programming GUI, USB driver and parameter file (PR5 file).

Table 3.1 Installation

Installation Order	Item	Method
1	Programming GUI, USB driver	Run the downloaded executable file (PG-FP5_Package_Vxxx.exe) and perform installation, following the directions on the installer screen. After installation, the USB driver detects the FP5 by plug-and-play, and it is automatically added.
2	PR5 file	Decompress the downloaded file to any folder. A *.pr5 file is decompressed into any folder, so copy it to the FP5_PRJ folder where the programming GUI is installed.

The folder configuration after programming GUI installation is as follows.



3.2.1. Notes on installation

(1) Multiple versions of the PG-FP5 can be installed on a single host PC. Although we recommend using the latest version of any development tool, leaving a previous version on your host PC and then installing the latest version lets you easily switch the development environment.

(2) You might be asked to reboot your computer after installing the PG-FP5. Be sure to close all other applications before rebooting your computer.

(3) You must have administrator privileges to install the PG-FP5.

(4) The PG-FP5 can only be installed in a folder that is named using ASCII characters. (Note that the 11 characters / * : < > ? | " \ ; , and character strings that begin and end with a space cannot be used.) The PG-FP5 might not operate correctly if installed in a folder that is named using other characters.

(5) The PG-FP5 cannot be installed from a network drive or on a network drive.

(6) The installer does not specify environment variable paths. If these paths are required, add them after installation.

(7) To use programming GUI, Microsoft .NET Framework, its language pack, and the runtime library of Microsoft Visual C++, which are provided by Microsoft Corporation, are necessary. The free evaluation version downloaded from our website include the processing for installing the above tools. When installing the free evaluation version in the Windows XP or Windows Vista environment where the above tools have not been installed, be sure to connect the host PC to the network before starting the setup procedure. To set up programming GUI in the PC that is not connected to the network, access the Microsoft Download Center and install Microsoft .NET Framework 4 before starting the setup procedure.

(8) If the installer is started on a non-Japanese version of Windows, then if the path contains multi-byte characters it will cause an error, and the installer will not start.

(9) The following folders created after installation (including the files under the folders) contain files required for the tools to operate. Do not delete them.

(Windows is the 32-bit edition and the system drive is C:)

C:\Program Files\Common Files\Renesas Electronics CubeSuite+\

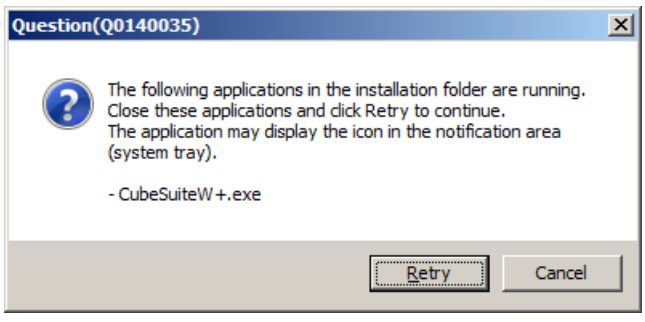
(Windows is the 64-bit edition and the system drive is C:)

C:\Program Files\Common Files (x86)\Renesas Electronics CubeSuite+\

(10) To change the folder of the installed tools, uninstall all the CubeSuite+ related software and the programming GUI for PG-FP5, and install them again.

(11) In the environment where the programming GUI for CubeSuite+ and PG-FP5 and USB driver for PG-FP5 are installed, the programming GUI for PG-FP5 and USB driver for PG-FP5 are included in the target software of the CubeSuite+ integrated uninstaller. If you don't want to delete them, remove them from the uninstallation targets.

(12) If a CubeSuite+ instance launched via Rapid Start is in the notification area (system tray) during installation, the following error will appear. Exit the application, and run the installer again.


Question(Q0140035)
The following applications in the installation folder are running.
Close these applications and click Retry to continue.
The application may display the icon in the notification area (system tray).
- CubeSuiteW+.exe
Retry
Cancel

3.3. Uninstallation

This section explains how to uninstall the programming GUI, USB driver, parameter file (PR5 file), customized setup file (ESF file) and setting information file (INI file). The uninstallation order is prescribed.

Table 3.2 Uninstallation

Item	Method
Programming GUI, USB driver	Open [Add or Remove Programs] (or [Add/ Remove Programs]) on the Control Panel and uninstall this program. The names are [PG-FP5 Vx.xx] and [USB Driver x86 for PG-FP5] (or [CubeSuite+ USB Driver x64 for Renesas MCU Tools]). Parameter files (*.pr5), setting files (*.esf), and INI file (FP5.ini) are not deleted.
PR5 file	Delete PR5 files (*.pr5) stored in the FP5_PRJ folder in the programming GUI installation folder.
ESF file	Delete ESF files (*.esf) stored in the FP5_PRJ folder in the programming GUI installation folder, or other folder.

3.4. Updating Programming GUI, Firmware and FPGA

The firmware and FPGA are programs embedded in the device for controlling the FP5. Updating the programming GUI, firmware and FPGA enables the following.

- Addition of newly supported functions or devices
- Correction of restrictions

Use of the latest versions of the programming GUI, firmware and FPGA are recommended to assure the FP5 operation. The latest versions are available on the following websites.

URLs

- Except for Europe area: http://www.renesas.com/pg_fp5
- For Europe area: http://www.renesas.eu/update → Section PG-FP5-EE

Note If update of firmware and FPGA is improperly performed, FP5 may no longer operate. Refer to the following procedure or method for updating.

Note If the firmware or FPGA is updated, the PR5 file, ESF file or program file may be deleted. In such cases, download the PR5 file, ESF file or program file again.

Be sure to follow the procedure below when updating the firmware and FPGA.

1. Check the current version. (Refer to 3.4.1 Checking the current version.)
2. If not the latest version, update the programming GUI. (Refer to 3.4.2 Installation of programming GUI.)
3. Update the firmware using the latest programming GUI. (Refer to 3.4.3 Installation of firmware update.)
4. Update the FPGA using the programming GUI. (Refer to 3.4.4 Installation of FPGA update.)

3.4.1. Checking the current version

(1) Open the main window of the programming GUI. (Refer to each microcontroller edition 1.1 Introduction.)

(2) Check the versions of the programming GUI, firmware and FPGA, as shown below.

Programming GUI: [Help] menu → [About]

Firmware: [Programmer] menu → [Reset] command[Note]

FPGA: [Programmer] menu → [Reset] command[Note]

Note Display example of [Reset] command

```
Firmware Version Vx.xx      ←Firmware version
Board H/W Vx,  FPGA Vx      ←FPGA version
Serial No.: XXXXXXXXXX
Standard mode usecured
```

(3) The latest versions are available on the following websites.

URLs

- Except for Europe area: http://www.renesas.com/pg_fp5
- For Europe area: http://www.renesas.eu/update → Section PG-FP5-EE

3.4.2. Installation of programming GUI

Run the downloaded executable file (PG-FP5_Package_Vxxx.exe). Perform installation, following the directions on the installer screen.

3.4.3. Installation of firmware update

Install the latest firmware by using the latest programming GUI. Decompress the file to any folder. The firmware file "fp5_fw_vxxx.rec" will be decompressed to the selected folder. ("xxx" indicates the firmware version.)

(1) Click the [Programmer] menu on the menu bar and select [Update Firmware]; the [Update Firmware] dialog box will then be opened.

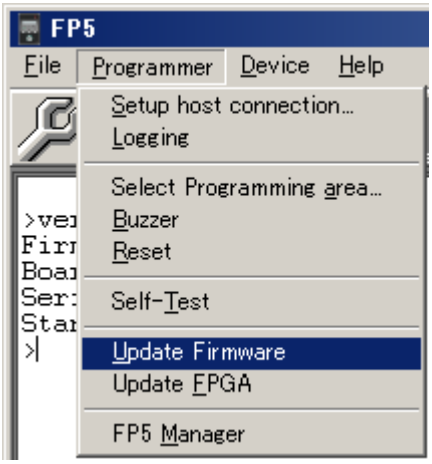


Figure 3.1 [Update Firmware] Command

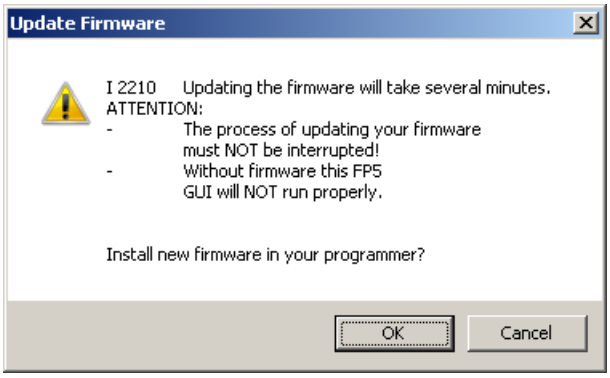

Update Firmware
I 2210 Updating the firmware will take several minutes.
ATTENTION:
- The process of updating your firmware must NOT be interrupted!
- Without firmware this FP5 GUI will NOT run properly.
Install new firmware in your programmer?
OK
Cancel

Figure 3.2 [Update Firmware] Dialog Box

(2) Click the OK button to continue firmware update. The [Open firmware file] dialog box is opened.

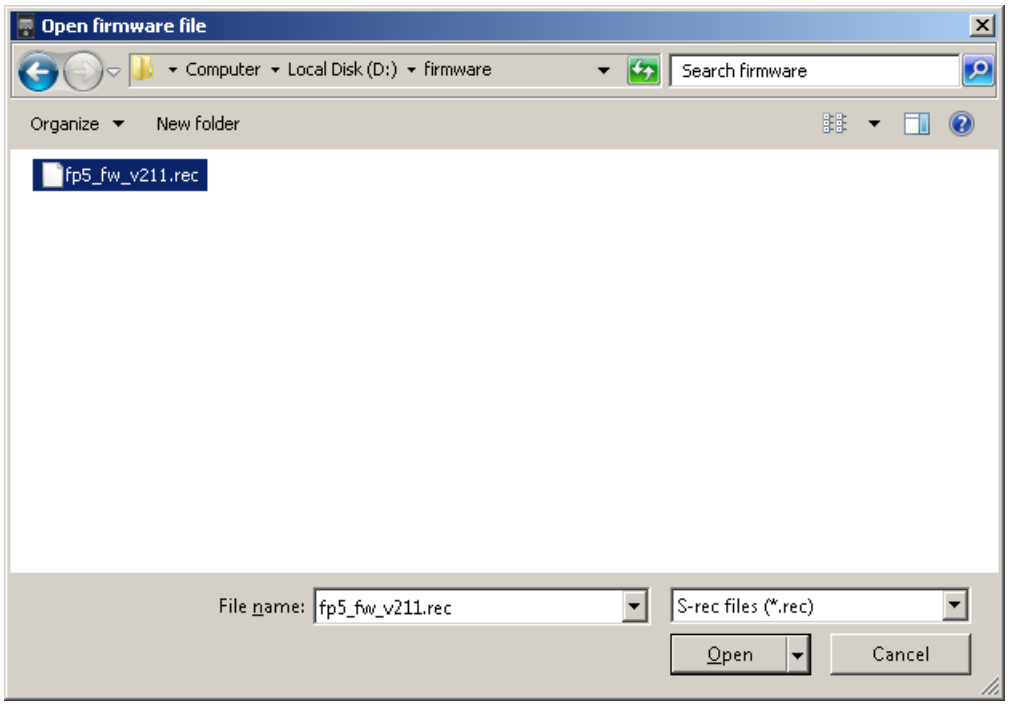


Figure 3.3 [Open firmware file] Dialog Box

Select the firmware file "fp5_fw_vxxx.rec" and then click the Open button.

Note 1. Do not use FP5 firmware other than the one posted on the website; otherwise, a defect may occur.

2. When a firmware of FP5 updates from V2.00 to V1.xx, a serial number of FP5 is erased. And, FP5 can't operate in USB1.1. In addition, the other functions don't have any problem. When FP5 revives, consult a Renesas Electronics sales representative or distributor.

(3) Some commands are sent to the FP5 and the update progress status is displayed in the action log window. The message “Firmware Update succeeds”, which indicates normal completion of firmware update, and “Restarting FP5..”, which is equivalent to [RESET] command processing, is automatically performed. The new version can then be checked as “Firmware Version Vx.xx”. The update takes about 10 seconds.

Note The action log window is a part of the main window of the programming GUI, which shows the operation progress status.

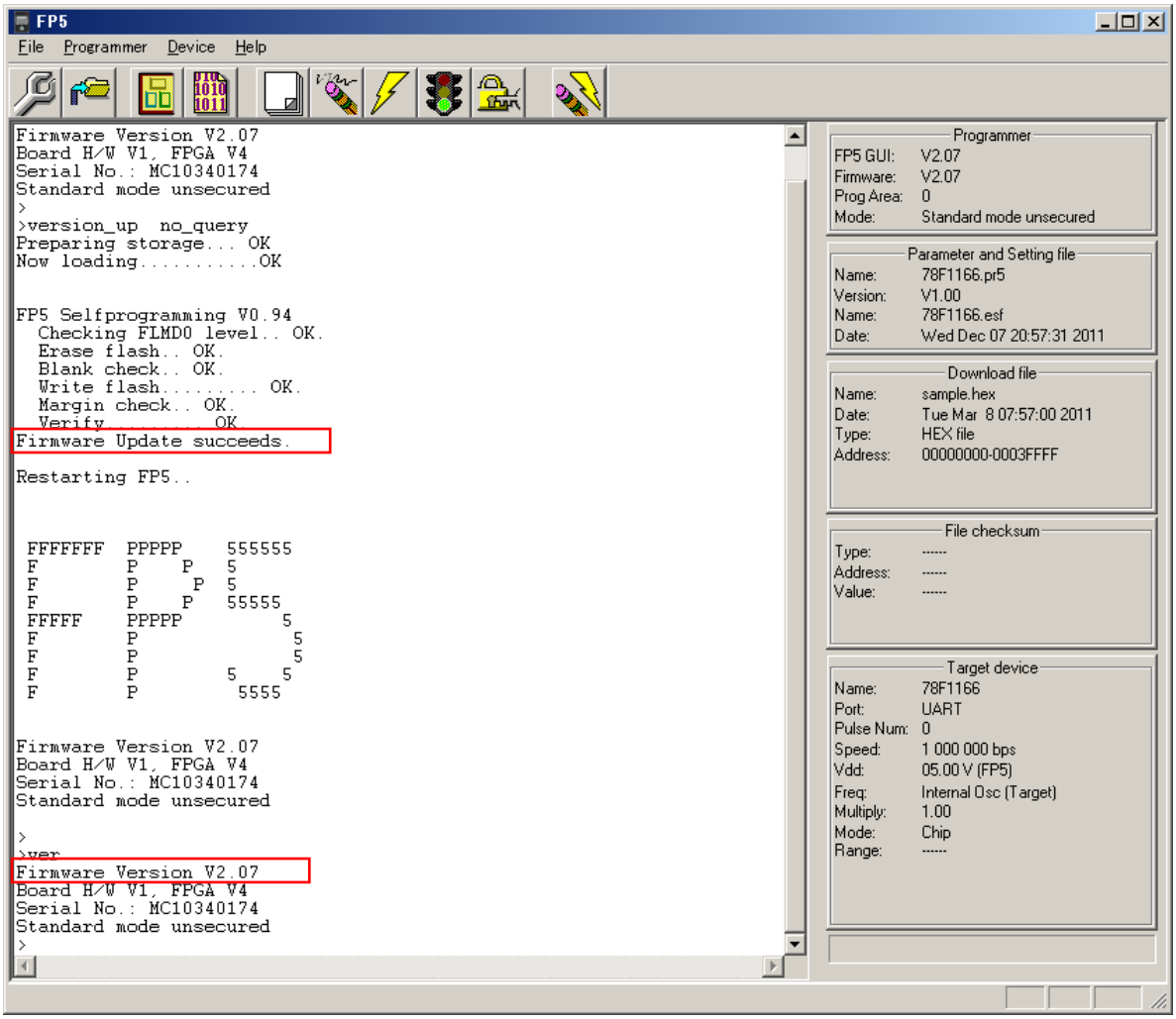
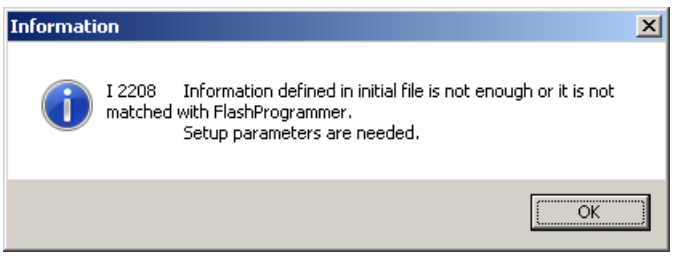


Figure 3.4 Action Log Window When Firmware Update Is Finished

Note Depending on the changes made, the following dialog box will be displayed. In this case, the information stored in the FP5 (PR5 file, ESF file, program file) will have been deleted, so please download those files again. (Refer to each microcontroller edition 1.2 Startup of Programming GUI.)


Information
I 2208 Information defined in initial file is not enough or it is not matched with FlashProgrammer.
Setup parameters are needed.
OK

3.4.4. Installation of FPGA update

Install the latest FPGA by using the latest programming GUI. Decompress the file to any folder. The FPGA file "fp5_fpga_vx.rec" will then be decompressed into the folder, so copy it to any folder. ("x" indicates the FPGA version.)

(1) Click the [Programmer] menu on the menu bar and select [Update FPGA]; the [Update FPGA] dialog box will then be opened.

Figure 3.5 [Update FPGA] Command

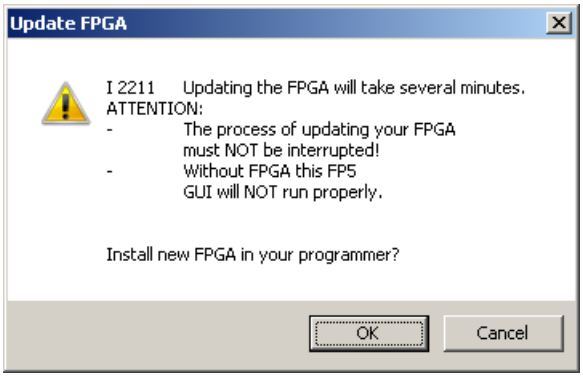

Update FPGA
I 2211 Updating the FPGA will take several minutes.
ATTENTION:
- The process of updating your FPGA must NOT be interrupted!
- Without FPGA this FP5 GUI will NOT run properly.
Install new FPGA in your programmer?
OK
Cancel

Figure 3.6 [Update FPGA] Dialog Box

(2) Click the OK button to continue FPGA update. The [Open FPGA file] dialog box is opened.

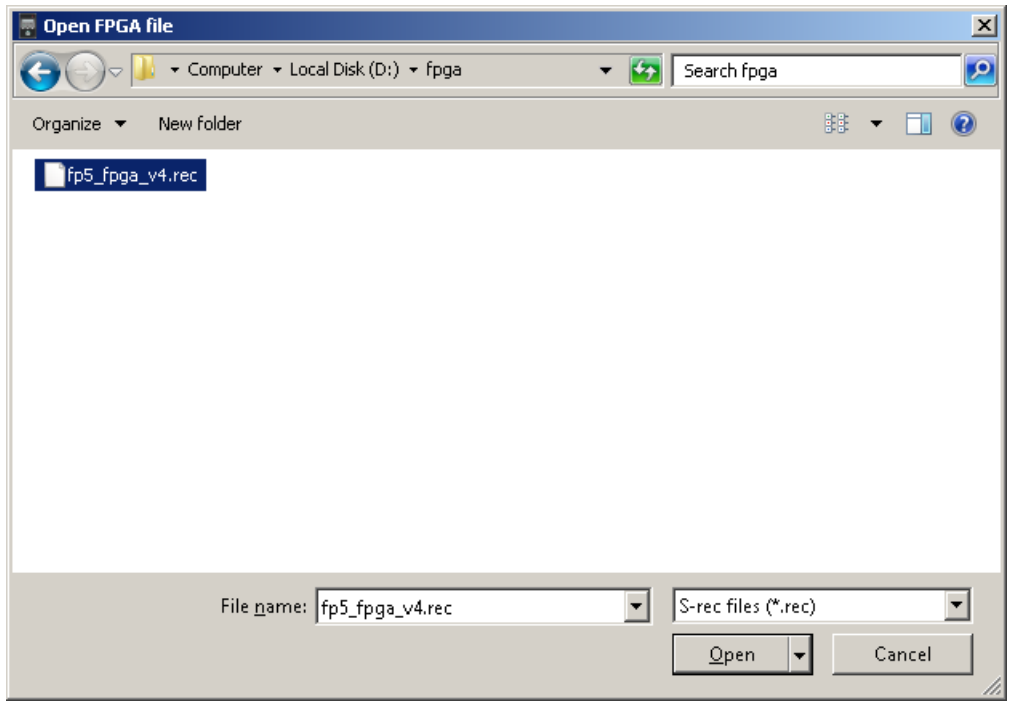


Figure 3.7 [Open FPGA file] Dialog Box

Select the FPGA file "fp5_fpga_vx.rec" and then click the Open button.

Note Do not use an FP5 FPGA other than the one posted on the website; otherwise, a defect may occur.

(3) Some commands are sent to the FP5 and the update progress status is displayed in the action log window. The message “FPGA Update succeeded”, which indicates normal completion of firmware update, and “FP5 Power will be switched OFF now.....”, which is equivalent to processing when the POWER button is turned off, is automatically executed. The update takes about 30 seconds.

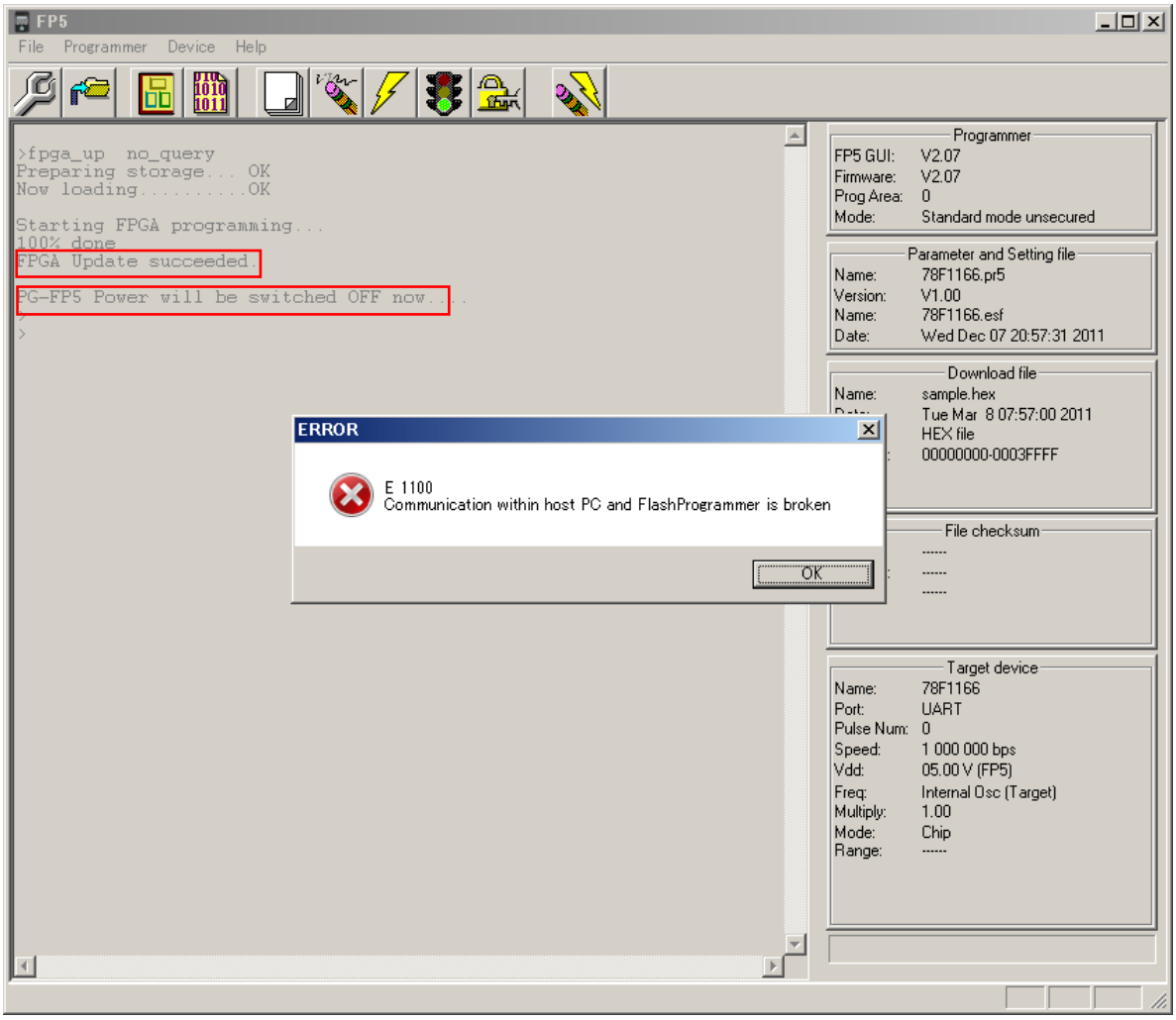


Figure 3.8 Action Log Window When FPGA Update Is Finished

(4) Click the OK button in the error message dialog box and then press the POWER button on the FP5 to turn on power.

(5) Click the [Programmer] menu on the menu bar and select [Setup host connection...]; the [Host Connection] dialog box will then be opened. Select the communication mode used and then click the OK button.

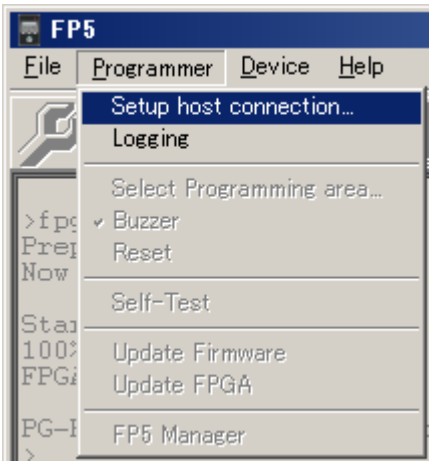


Figure 3.9 [Setup host connection] Command

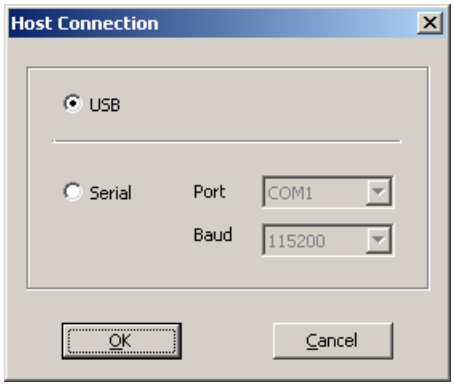


Figure 3.10 [Host Connection] Dialog Box

(6) Communication with the host PC is established. “FPGA Vx” is displayed in the action log window; thus, the version can be checked.

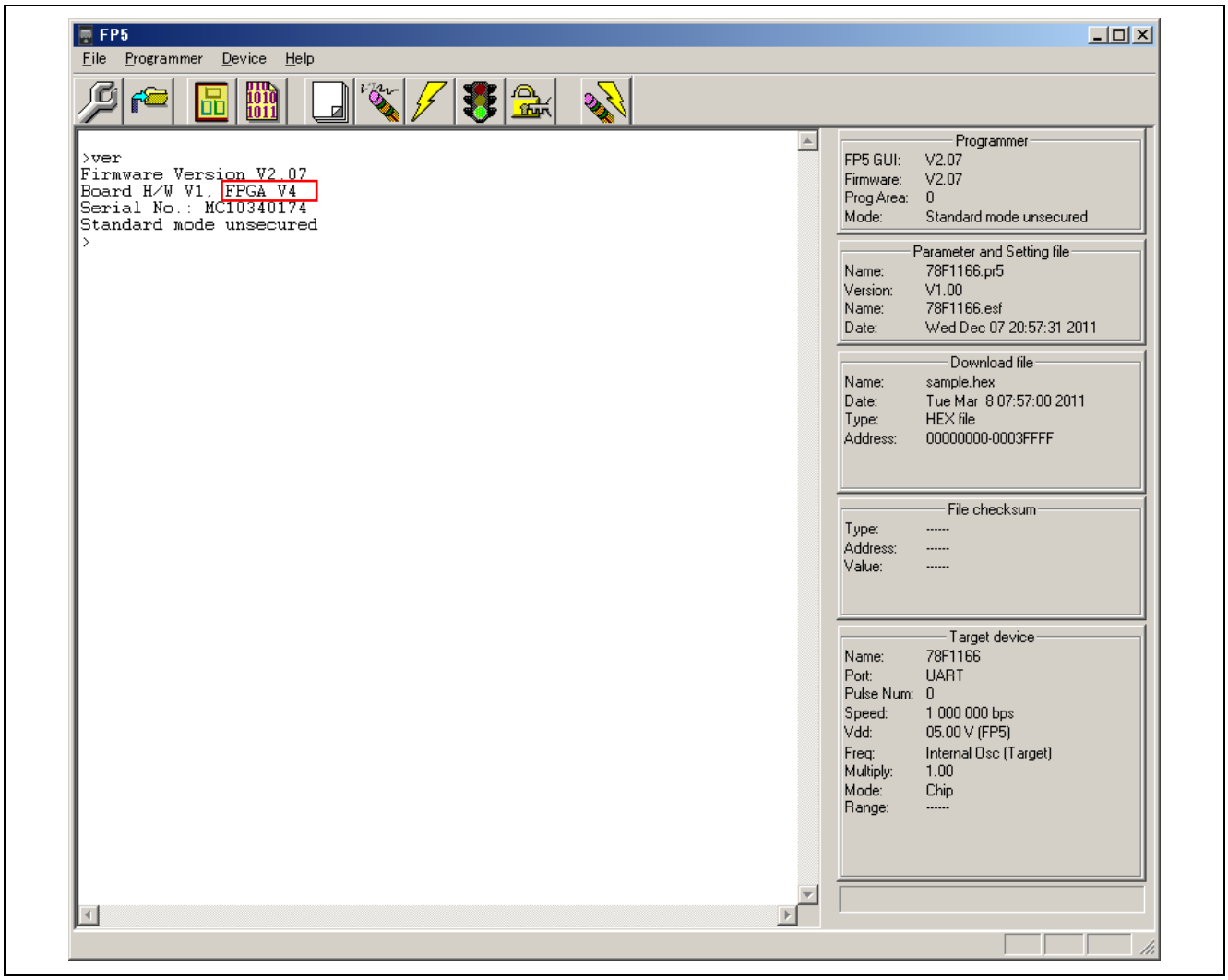


Figure 3.11 Version Confirmation After FPGA Update Is Finished

4. USAGE IN STANDALONE MODE

The FP5 has a standalone mode in which the FP5 by itself can execute the [Erase], [Program], and [Autoprocedure(E.P.)] commands without a host PC. This mode is useful for using the FP5 on the production line during mass production and for upgrading in the field.

4.1. Before Starting Standalone Operation

In standalone mode, the FP5 can select any programming area based on PR5 files, ESF files and program files stored in the multiple internal flash memory areas (programming areas) and write it. New PR5 files, ESF files and program files cannot be downloaded to the FP5 in this mode. Programming is possible only in environments to which files were downloaded last time by the programming GUI.

4.2. Description of Buttons, Message Display and Status LEDs

In standalone mode, command menus are selected and executed using the control button NEXT, ENTER, CANCEL or START on the top of the FP5 main unit.
The selected command menu is displayed in the message display, and the result of command execution is indicated by the message display and status LEDs. When the FP5 Manager dialog box is used to enable [Enable Bank mode] or [Enable Simple mode], the functions of the control buttons and message display will change. Refer to each microcontroller edition 1.3.2 (9) [FP5 Manager] command and 5 USAGE THE REMOTE CONNECTOR. This chapter will describe usage in the normal mode.
The command menu consists of two levels of menus: a main menu and submenu.

The NEXT button is used to display the next menu on the same level.
The ENTER button is used to select or execute the menu item currently displayed.
The CANCEL button is used to cancel the current selection and return to the previous menu level. The command currently running cannot be stopped, except for the [Read] command.
The START button executes the [Autoprocedure(E.P.)] command. It can be executed from any command menu, and the display returns to the same command menu after execution.

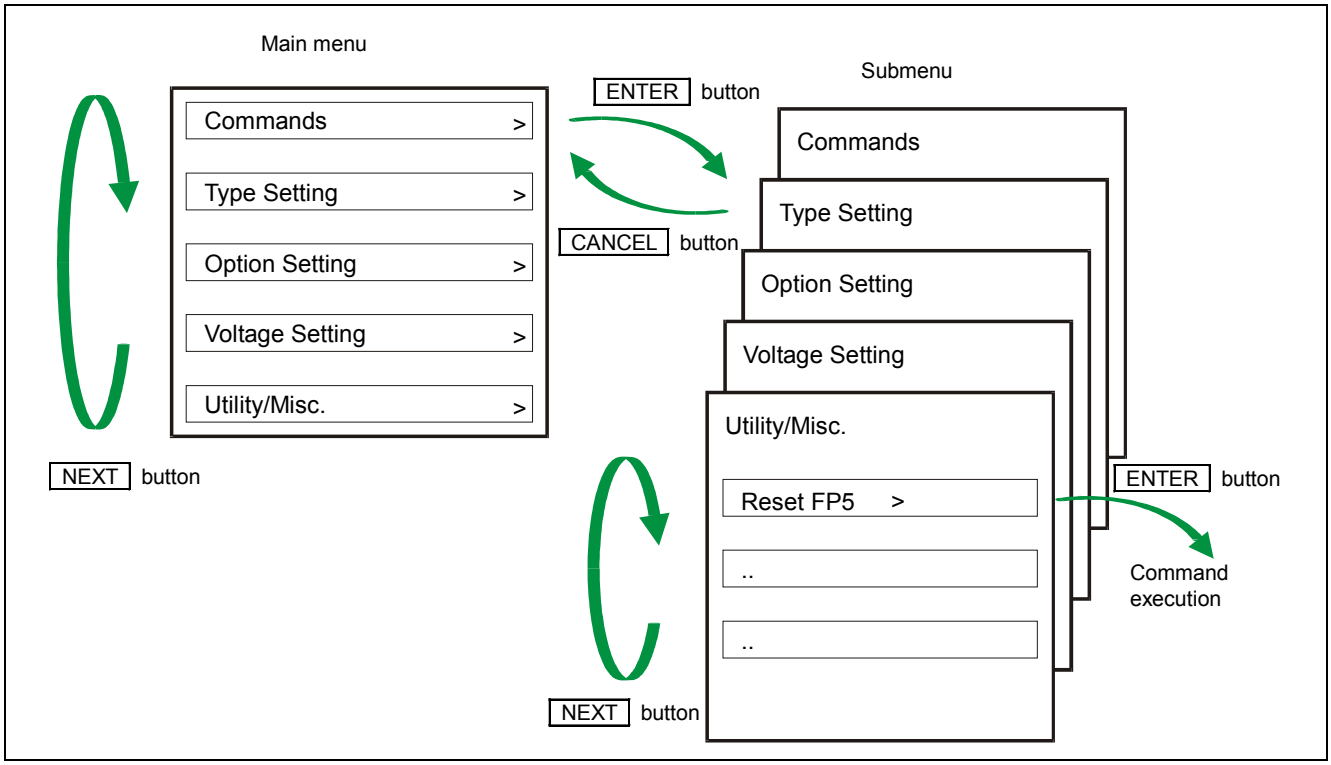


Figure 4.1 Menu Status Transition by Button Input

On the main menu level, the FP5 shows the menu items that can be selected. On the submenu level, the first line in the message display shows the menu item and the second line shows the response from the FP5, if any.
A command prompt '>' displayed at the end of a menu line indicates that it is selectable with the ENTER button, or that the menu (command) can be executed. If the command prompt '>' is not displayed at the end of a menu line, it means that the function is available only for display.
When power to the FP5 is turned on, the POWER LED turns on and 'Commands >' is displayed in the message display.
The status LEDs indicate the status of communication with the device and the result of execution, as follows.

Status LED	Status
Green	The selected command has been executed correctly. The command that has been correctly executed is displayed in the message display.
Orange	The selected command is under execution. The detailed execution status is displayed in the message display.
Red	The selected command has been terminated by an error. The error details are displayed in the message display.

Note For details on the errors displayed in the message display, refer to error message A.4. Error Messages Displayed in FP5 Message Display.

4.3. Standalone Operation Menu

In standalone mode, the programming environment of the target device can be checked and then programs can be written by using the commands explained in this section.

4.3.1. [Commands] menu

The [Commands] menu provides various commands required for programming the target device. Select a command from this menu and press the ENTER button; the FP5 will then execute the command for the target device, based on the settings downloaded to the valid programming area. For details on command execution, refer to each microcontroller edition 1.3.3[Device] menu.

Table 4.1 [Commands] Menu (1)

Main Menu	Submenu	Description
[Commands >]	[E.P. >]	Pressing the ENTER button executes the [Autoprocedure(E.P.)] command.
	[Program >]	Pressing the ENTER button executes the [Program] command.
	[Erase >]	Pressing the ENTER button executes the [Erase] command.
	[Verify >]	Pressing the ENTER button executes the [Verify] command.
	[Set Security >]	Pressing the ENTER button executes the [Set Security] command.
	[Checksum >]	Pressing the ENTER button executes the [Checksum] command. The checksum value read from the target device is displayed in the message display. <When a product with no data flash is selected from the 78K/V850/RL78 family> Checksum:xxxx <When a product with data flash is selected from the 78K/V850/RL78 family> Code Flash sum: xxxx -> Enter Click the ENTER button. Data Flash sum: xxxx -> Enter Click the ENTER button. Total sum: xxxx -> Enter <When RX family, RH850 family, R8C family, or SuperH family is selected> User mat sum: xxxxxxxx -> Enter Click the ENTER button. Data mat sum: xxxxxxxx -> Enter Click the ENTER button. UB mat sum: xxxxxxxx -> Enter Click the ENTER button. Total sum: xxxxxxxx -> Enter The comparison result is also displayed if [Enable checksum compare function] in FP5 management setting is enabled. Checksum: Compare:PASS (or ERROR)

Table 4.1 [Commands] Menu (2)

Main Menu	Submenu	Description
[Commands >]	[Set Lock bits >]	Pressing the ENTER button executes the [Set Lock bits] command.
	[Set OptionBytes >]	Pressing the ENTER button executes the [Set Option bytes] command.
	[Set OCD-Sec-ID >]	Pressing the ENTER button executes the [Set ID Code] command.
	[Set ID Code >]	Pressing the ENTER button executes the [Set ID Code] command.
	[Set Lock bits >]	Pressing the ENTER button executes the [Set Lock bits] command.
	[Blank check >]	Pressing the ENTER button executes the [Blank check] command.
	[Signature >]	Pressing the ENTER button executes the [Signature read] command. The device name is displayed in the message display. Display example: Signature: D78F1166
	[Connect >]	Pressing the ENTER button executes the con command. Issuing the autocon command “autocon off” causes display of this item in the submenu while the autocon command “autocon on” removes it from the submenu. For more information on the function, refer to chapter 6, Using Communications Commands.
	[Disconnect >]	Pressing the ENTER button executes the dcon command. autoconコマンドで“autocon off”を実行するとサブメニューに表示されるようになり，“autocon on”を実行するとサブメニューに表示されなくなります。機能の詳細は，6通信コマンドの使用方法を参照してください。
	[Progarea >]	Used to select the valid programming area. The valid programming area can be changed by pressing the ENTER button. <Display example> (if ENTER button is pressed): Commands Prog Area now: 1 (Changes the valid programming area from Area 0 to Area 1.) The currently selected programming area can be checked in the [Programmer] area in the programming parameter window of the programming GUI. The factor for dividing the programming area is the value set in the [Programming Area Setting] area in the Device Setup dialog box.

4.3.2. [Type Setting] menu

The [Type Setting] menu is used to check information (target device programming environment settings) contained in the ESF file downloaded to the FP5. The settings downloaded to the valid programming area are displayed. All the values displayed are those downloaded last time by the programming GUI. The settings cannot be changed using this menu.

Table 4.2 [Type Setting] Menu

Main Menu	Submenu	Description
[Type Setting >]	[Device Port]	Displays any of the following to indicate which mode is selected for communication between the target device and the FP5. SIO 0, SIO 1, SIO 2, SIO H/S, IIC 0, IIC 1, IIC 2, IIC 3, UART 0, UART 1, UART 2, UART 3, PORT 0, PORT 1, PORT 2
	[Multiply Rate]	Displays the multiplication rate of the operating clock for the target device.
	[Serial CLK]	Displays the serial clock rate in Hz that is used for communication between the target device and the FP5.
	[CLK source]	Indicates either of the following as a source of the operating clock supplied to the target device. Programmer: Clock is supplied from the FP5. Target: Clock is supplied from the user system.
	[PG CPU CLK]	Indicates the frequency of the clock supplied from the FP5 in MHz.
	[Target CPU CLK]	Indicates the frequency of the clock on the user system that is supplied to the target device, in MHz.
	[Operation Mode]	Indicates *chip*, *area*, or *block* as the operation mode when the [Blank check], [Erase], [Program], [Verify], [Checksum], or [Autoprocedure(E.P.)] command is executed. Chip, Area, Block, Block(Code), Block(Data), Block(Code+Data) <Display example> Operation Mode Chip
	[Operation Range]	Indicates which of the areas in the target device connected to the FP5 is to be written to. This menu shows a valid display only when the operation mode is not Chip (when the operation mode is Area or Block). <Display example> Operation Range 0 to 1 *In chip mode, the display is always as follows: <Display example> Operation Range 0 to 127

4.3.3. [Option Setting] menu

The [Option Setting] menu is used to check the command options and security settings currently set for the FP5. The settings downloaded to the valid programming area are displayed. All the values displayed are those downloaded last time by the programming GUI. The settings cannot be changed using this menu.

Table 4.3 [Option Setting] Menu (1)

Main Menu	Submenu	Description
[Option Setting >]	[BLN before ERS]	Displays the setting of the [Blank check before Erase] check box in the [Command options] area on the [Advanced] tab in the Device Setup dialog box. on: Selected, off: Not selected
	[VRF after PRG]	Displays the setting of the [Verify after Program] check box in the [Command options] area on the [Advanced] tab in the Device Setup dialog box. on: Selected, off: Not selected
	[SCF after PRG]	Displays the setting of the [Security after Program] check box in the [Command options] area on the [Advanced] tab in the Device Setup dialog box. on: Selected, off: Not selected
	[SUM after PRG]	Displays the setting of the [Checksum after Program] check box in the [Command options] area on the [Advanced] tab in the Device Setup dialog box. on: Selected, off: Not selected
	[OPB after PRG]	Displays the setting of the [Set Option bytes after Program] check box in the [Command options] area on the [Advanced] tab in the Device Setup dialog box. on: Selected, off: Not selected
	[IDC after PRG]	Displays the setting of the [Set OCD Security ID after Program] check box in the [Command options] area on the [Advanced] tab in the Device Setup dialog box. on: Selected, off: Not selected
	[RUN after Disc.]	Displays the setting status of the [Run after Disconnect] check box in the [Command options] area of the device setup dialog [Advanced] tab. On: Checked Off: Not checked When on, the FP5 Manager [Reset option of Run after Disconnect] setting will also be displayed. <Display example> On (Hi-Z)
	[Enable TargetRes]	Displays the setting status of the [Enable target Reset] check box in the [Command options] area of the device setup dialog [Advanced] tab. On: Checked Off: Not checked
	[Prog Area]	Displays the valid programming area. Display example (in the case where the valid programming area is Area 0): Prog Area On (0)
	[Chip ERS dis.]	Displays the setting of the [Disable Chip Erase] check box in the [Security flag settings] area on the [Advanced] tab in the Device Setup dialog box. on: Selected, off: Not selected
	[Block ERS dis.]	Displays the setting of the [Disable Block Erase] check box in the [Security flag settings] area on the [Advanced] tab in the Device Setup dialog box. on: Selected, off: Not selected

Table 4.3 [Option Setting] Menu (2)

Main Menu	Submenu	Description
[Option Setting >]	[PRG disable]	Displays the setting of the [Disable Program] check box in the [Security flag settings] area on the [Advanced] tab in the Device Setup dialog box. on: Selected, off: Not selected
	[READ disable]	Displays the setting of the [Disable Read] check box in the [Security flag settings] area on the [Advanced] tab in the Device Setup dialog box. on: Selected, off: Not selected
	[Boot Blk PRG dis]	Displays the setting of the [Disable boot block cluster reprogramming] check box in the [Security flag settings] area on the [Advanced] tab in the Device Setup dialog box. on: Selected, off: Not selected
	[Reset Vector]	Displays the setting of the [Reset vector:] check box in the [Reset vector settings] area on the [Advanced] tab in the Device Setup dialog box. Display example: Reset vector Addr: 0x000000
	[End Boot Blk]	Displays the setting of the [Boot Block end] check box in the [Block protection] area on the [Advanced] tab in the Device Setup dialog box. Display example: End Boot Blk 0
	[FS area]	Displays the setting of the [FSW Block start] and [FSW Block end] check boxes in the [Block protection] area on the [Advanced] tab in the Device Setup dialog box. Display example: FS area 0 to 127
	[OCD ID: xxxxxxxx]	Displays the setting of the [OCD security ID setting] box in the [OCD security ID setting] area on the [Advanced] tab in the Device Setup dialog box. Display example: If 123456789ABCDEF123456789 is specified in the [OCD security ID setting] box OCD ID: 12345678 9ABCDEF123456789
	[OPBTx x = 0 to 8]	Displays the setting of the [Option bytes setting] box in the [Option bytes setting] area on the [Advanced] tab in the Device Setup dialog box. If the [NEXT] button is clicked, the display changes from OPBT0 to OPBTx. Display example: If FFFFFFE9 is specified for OPBT0 in the [Option bytes setting] area OPBT0 FFFFFFE9

4.3.4. [Voltage Setting] menu

The [Voltage Setting] menu is used to check the voltage level setting used when programming the target device currently connected to the FP5. The settings downloaded to the valid programming area are displayed. The settings cannot be changed using this menu.

Table 4.4 [Voltage Setting] Menu

Main Menu	Submenu	Description
[Voltage Setting>]	[Vdd]	Displays the value of V_{DD} supplied to the target device connected to the FP5 in volts.
	[Vdd2]	Displays the value of V_{DD2} supplied to the target device connected to the FP5 in volts.
	[Vdd Source]	Indicates the source of V_{DD} supplied from the target device as either of the following. V_{DD} from PG: V_{DD} is supplied from the FP5. V_{DD} from device: V_{DD} is supplied from the user system.
	[Vdd Monitoring]	Displays the setting of the [Vdd monitoring] check box in the [Supply voltage] area in the Device Setup dialog box. on: Selected, off: Not selected
	[WideVoltage mode]	Displays the setting of the [Wide Voltage Mode] check box.
	[FLMD0 Level]	The FLMD0 Level displays the voltage level of the FLMD0 signal.
	[CLK Level]	Indicates the voltage level of the clock signal as either of the following. VDD VDD2
	[RESET Level]	The Reset Level displays the voltage level of the $\overline{\text{RESET}}$ signal. VDD Also, when the [Enable target RESET] check box in the [Command options] area of the device setup dialog is enabled, "VDD Reset TrigIn" is displayed.
	[Serial Level]	Indicates the voltage level of the serial communication signals. The high level of the serial communication signal is indicated as either of the following. VDD VDD2
	[Vpp]	Indicates the value of V_{PP} supplied to the target device connected to the FP5 in volts.

4.3.5. [Utility/Misc.] menu

The [Utility/Misc.] menu is used to reset the FP5 main unit, tune the LCD contrast, check the firmware version, check the name and version of the PR5 file downloaded, check the name of the program file downloaded, and check the checksum of program files. The settings downloaded to the valid programming area are displayed. The settings cannot be changed using this menu.

Table 4.5 [Utility/Misc.] Menu

Main Menu	Submenu	Description
[Utility/Misc. >]	[Utility]	Displays the state of the [FP5 Manager] command in the [Programmer] menu. <Display example> Std. mode Sec: A password has been registered. Std. mode unSec: A password has not been registered.
	[Reset FP5 >]	Pressing the ENTER button resets the FP5.
	[Set LCD Contr. >]	Tunes the contrast in the message display. After pressing the ENTER button, the contrast can be tuned using the NEXT (darken) or CANCEL button (lighten). To fix the contrast, click the ENTER button.
	[FP5 F/W Version]	Displays the FP5 firmware version. <Display example> FP5 F/W Version V1.00
	[PRM Name]	Displays the name of the PR5 file stored in the FP5 valid programming area. <Display example> PRM Name 78F1166
	[PRM File Version]	Displays the version of the PR5 file stored in the FP5 valid programming area. <Display example>: PRM File Version V1.00
	[HEX File Name]	Displays the name of the program file stored in the FP5 valid programming area. <Display example> HEX File Name Sample.hex “n.a.” is displayed if the program file is invalid.
	[File Checksum]	File Checksum will display the results of executing the programming GUI [File] menu -> [Checksum...] command. <Display example> File Checksum 623E (ARITHM.)

5. USAGE THE REMOTE CONNECTOR

This chapter describes the use of the remote connector.
The FP5 can be remote controlled by connecting the remote connector and external control device. Remote control can be used to operate and check writing and PASS/ERROR displays from the external control device.

5.1. Remote Interface Mode

The remote interface has a standard mode and a bank mode.
The modes are switched by using the FP5 Manager [Enable Bank mode] check box.

Standard mode: The same signals as the control buttons (NEXT, ENTER, CANCEL) on the command menu of the FP5 unit can be input.
Bank mode: This mode allows inputting of the bank signals (BANK0-2) that indicate the programming area. The control buttons (NEXT, ENTER, CANCEL) will change their functions to those inputting bank signals, so that the command menu displayed on the FP5 message display will be disabled.

5.2. Remote Connector Pins

The FP5 remote connector pins have the following functions. All inputs will become active with an effective level of 50 ms or greater. Note that the pin numbers in Table 7-1 are the pin numbers on the FP5 remote connector.

Table 5.1 Remote Interface Pin Functions

Pin number	Input/ Output	Pin name		Function	Active level
1	Output	CONN		Indicates that the remote interface is connected. When the FP5 power is ON, the CONN is always valid.	High level
2	Output	BUSY		Outputs the status indicated by the status LED “BUSY”. Note that the BUSY signal differs from the status LED and does not blink.	High level
3	Output	PASS		Outputs the status indicated by the status LED “PASS”.	High level
4	Output	ERROR		Outputs the status indicated by the status LED “ERROR”.	High level
5	Input	Standard mode	CANCEL	Same as the CANCEL button function.	Low level
	Input	Bank mode	BANK0	Indicates the lowest 1 bit of the 3-bit programming area number.	Low level
6	Input	Standard mode	ENTER	Same function as the ENTER button.	Low level
	Input	Bank mode	BANK1	Indicates the middle 1 bit of the 3-bit programming area number.	Low level
7	Input	Standard mode	NEXT	Same as the function of the NEXT button.	Low level
	Input	Bank mode	BANK2	Indicates the highest 1 bit of the 3-bit programming area number.	Low level
8	Input	VRF		Inputs the independent verify signal.	Low level
9	Input	START		Inputs the “START” (Auto-procedure (E.P.)) signal.	Low level
10	Input	CLR		Clears (disables) the “PASS” and “ERROR” signals.	Low level
11 to 15	–	GND		Grounding pin	–

Table 5.2 Programming Area and Banks

	BANK2	BANK1	BANK0
Programming area 0	0	0	0
Programming area 1	0	0	1
Programming area 2	0	1	0
Programming area 3	0	1	1
Programming area 4	1	0	0
Programming area 5	1	0	1
Programming area 6	1	1	0
Programming area 7	1	1	1

Note 1. 0: Low level
1: High level
2. When set in programming area 0, set in programming area 0, set BANK0, BANK1, and BANK2 to the low level.
When set in programming area 3, set BANK0 and BANK1 to the high level, and BANK2 to the low level.

Next, the pin assignment of the remote connector is shown.

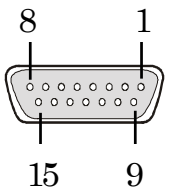


Figure 5.1 Remote Connector (D-SUB 15 pin connector (female)) Pin Assignment

Note Remote connector (D-SUB 15 pin connector (female)) model number: 07433FB015S200ZU (Suyin Connector)

5.3. Equivalence Circuits

In the DC properties of the remote interface, 4.7 k-ohm pull-up processing is executed so that the output signal has CMOS output from 74LV126A (3.3 V) and the input signal has input from 74LV126A (3.3 V).

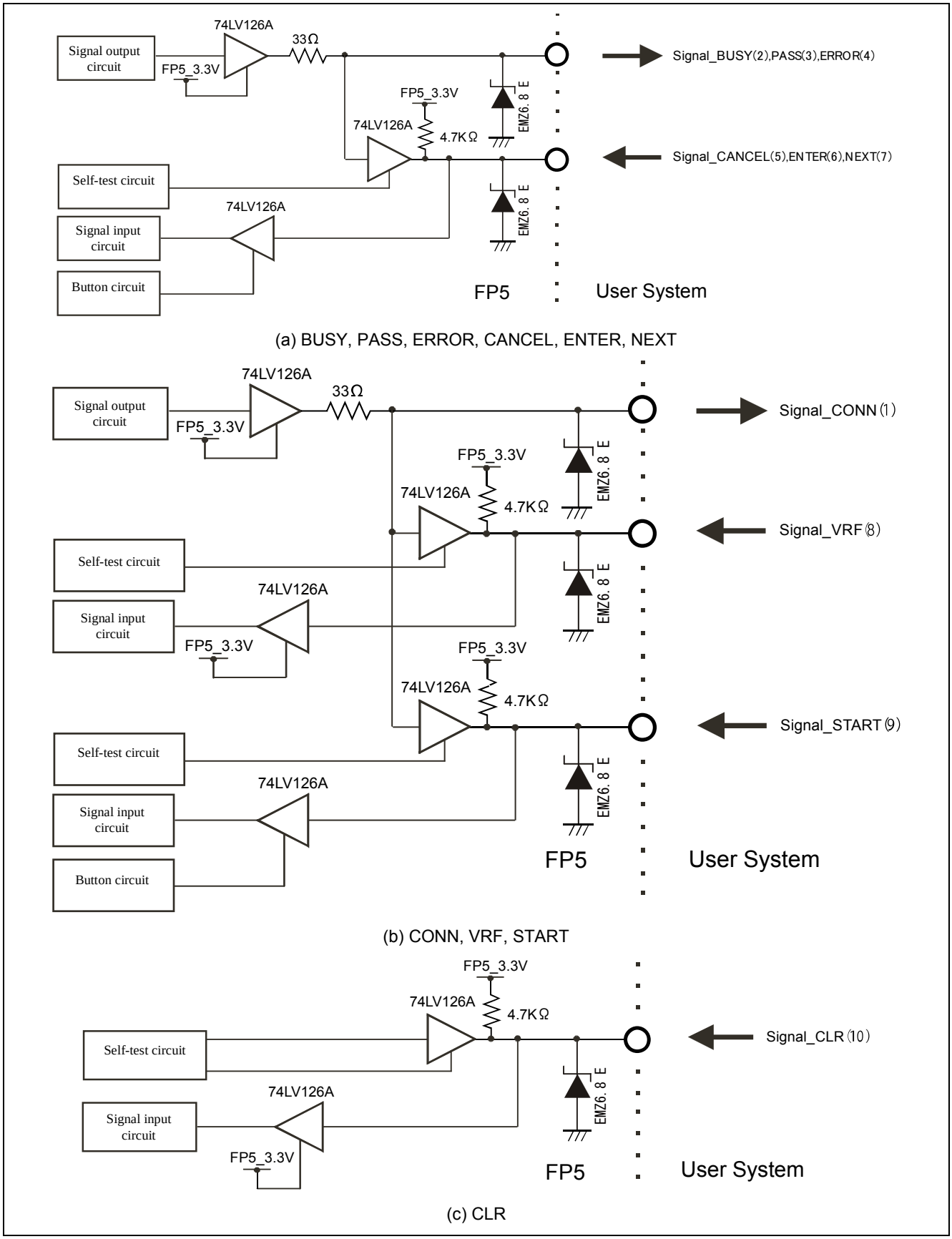


Figure 5.2 Equivalence Circuit

5.4. External Connection Example

A connection example with a remote connector, external switch and LED is shown.

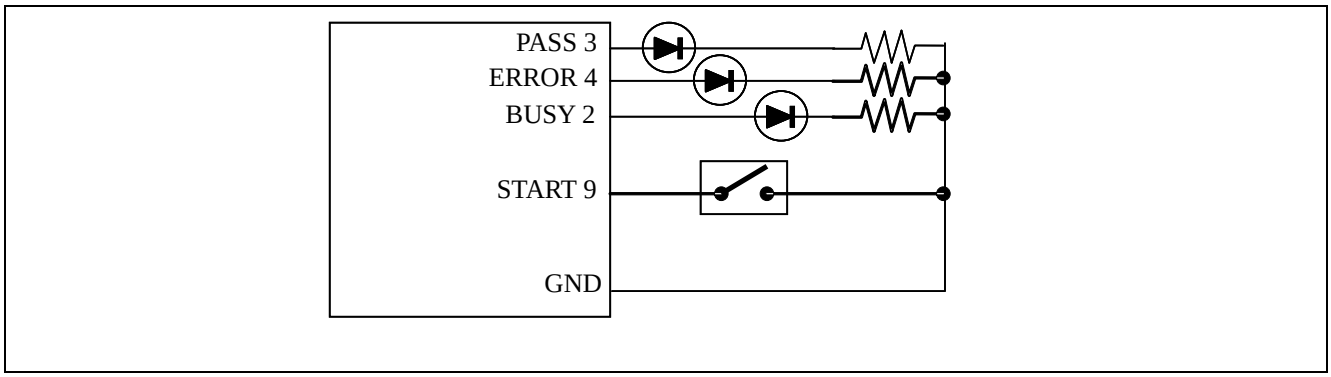


Figure 5.3 External Switch and LED Connection Example

6. USAGE COMMUNICATION COMMANDS

This chapter describes how to use communications commands from a host PC to operate the FP5.

6.1. Starting the Communications Software

In order to use communications commands for operation, communications with the FP5 must be established with communications software. In this chapter, we shall describe how to use communications software to establish communications.

(1) Connecting the system

Connect a serial cable to the serial port on your host PC, and then connect the other end to the serial connector on the FP5. Next, plug the AC adaptor into an outlet, then connect it to the FP5 power supply connector.

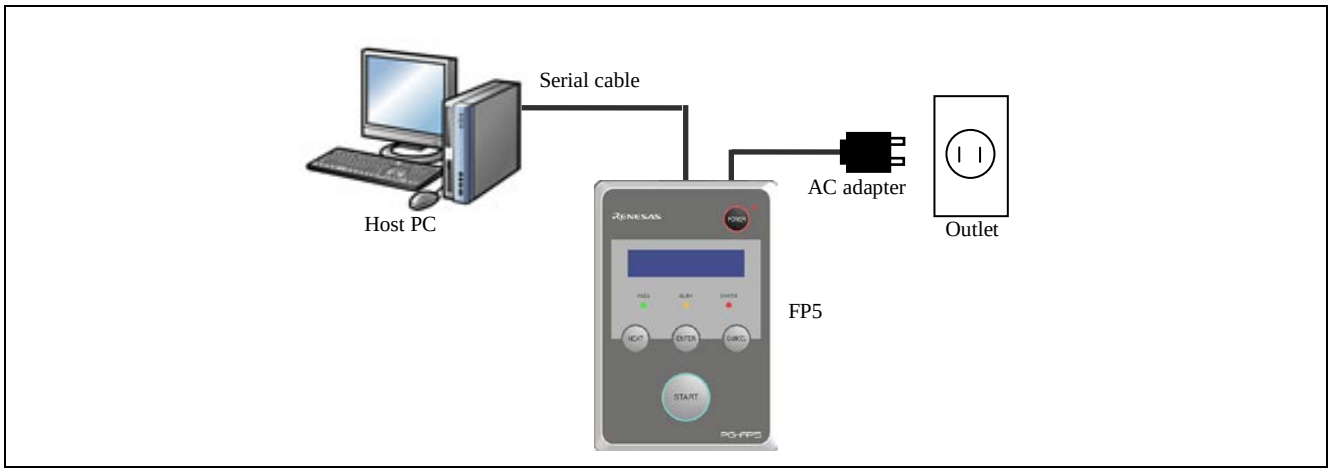


Figure 6.1 System Connections

(2) Start the FP5

After the connections are made, press the FP5 POWER button to turn the power on. If the unit starts correctly, the POWER LED will light, and “Commands >” will be displayed on the message display.

If the unit does not come on in the manner described above, then there may be a malfunction in the FP5, so consult a Renesas Electronics sales representative or distributor.

(3) Start communications software
Start communications software
Check the COM port number with Device Manager.

Figure 6.2 Checking the COM Port Number Settings

Select the data transfer conditions listed below.

Data transfer rate: 9600 bps, 19200 bps, 38400 bps, 57600 bps, 115200 bps
Data bits: 8 bit
Parity: None
Stop bit: 1 bit
Flow control: Hardware

The default data transfer rate is 9600 bps, but it may be changed by the programming GUI or terminal commands to another rate. In such cases, use the [Setup host connection...] in the programming GUI [Programmer] menu to check the transfer rate and make sure they match.

When communications software starts correctly, the main window will open. If communications are established, then a ">" will be displayed when the Enter key on the host PC is pressed. This completes the preparation for using communications commands.

Caution Press the Enter key once after FP5 has started. Alternatively, send a linefeed code once to FP5 by using communication software.

6.2. Command List

The following is a list of FP5 control commands and device commands.

Table 6.1 List of FP5 Control Commands

Command name	Description
autocon	Selects and confirms automatic or manual execution of the processes, from “transition to flash memory programming mode” to “signature verification”, and “the termination of the flash memory programming mode”.
brt	Confirms and changes the data transfer rate during serial communication with the host PC.
conf	Displays a list of the information stored in the FP5 and changes the number of programming area sections.
dwnprm	Downloads the PR5 file.
downset	Downloads the ESF file.
fcks	Executes the programming GUI [File] menu -> [Checksum...] command.
files	Displays the information concerning the program file that was downloaded to the FP5.
fpga_up	Updates the FPGA.
hex	Uploads the program file in Intel HEX format.
hlp	Displays a list of available commands, with simple descriptions.
lod	Downloads the program file.
prm	Displays the information concerning the PR5 file and ESF file that were downloaded to the FP5.
progarea	Confirms, changes and deletes data in the valid programming areas.
pwr_off	Turns off the FP5 power supply.
res	Resets the FP5.
security	Confirms the security state that can be set by the [FP5 Manager] command.
selftest	Executes a self-test.
serno	Sets the unique code for embedding in the program file.
sound	Sets the buzzer.
srec	Uploads the program file in Motorola HEX format.
trc	Displays the communication information between the FP5 and target device.
upprm	Uploads the PR5 file.
upset	Uploads the ESF file.
ver	Displays the FP5 version and FP5 mode.
version_up	Updates the firmware.

Table 6.2 List of FP5 Device Commands

Command name	Description
bln	Executes the [Blank check] command.
clr	Executes the Configuration clear.
con	Executes the processes from “transition to flash memory programming mode” to “signature verification”.
dcon	Executes the termination of the flash memory programming mode.
ep or epv	Executes the [Autoprocedure (E.P.)] command.
ers	Executes the [Erase] command.
gdi	Get the information of blank check and flash option.
ged	Get the information of endian.
gid	Get the ID code.
glb	Get the information of lock bit.
gob	Get the information of option byte.
gof	Get the information of OFS.
gos	Get the information of flash option.
got	Get the information of OTP.
gsc	Get the information of security.
idc	Executes the ID code setting.
opb	Executes the [Set Option bytes] command.
otp	Executes the OTP setting.
prg	Executes the [Program] command.
read	Executes the [Read] command.
scf	Executes the [Set Security] command.
sed	Executes the endian settinng.
sid	Sets the ID code and enables ID authentication in the serial programming mode.
sig	Executes the [Signature read] command.
slb	Executes the [Set Lock bits] command.
spd	Executes the disable serial programming setting.
sum	Executes the programming GUI [Device] menu -> [Checksum] command.
vrf	Executes the [Verify] command.

6.3. Description of Commands

Each of the commands is described using the following format.

Command name

Presents an overview of the command.

Input format

Presents the input format for the command[Note].

Description of the function

Describes the function of the command.

Example of usage

Presents an example of using the command.

Note The symbols used to describe the input format are defined below.

Notation	Description
Characters within single quotation marks ' '	Characters that must be input as displayed
Characters within angle brackets < >	Information that must be provided
Characters within parentheses ( )	Optional items
Options separated by vertical bars |	Options where only one option can be selected

6.4. Description of FP5 Control Commands

This section will describe the FP5 control commands.

6.4.1. autocon command

Selects and confirms automatic or manual execution of the processes, from “transition to flash memory programming mode” to “signature verification”, and “the termination of the flash memory programming mode”.

Input format

'autocon' ('on | off')

Description of the function

Selects either automatic (on) or manual (off) execution, to be executed before and after the device command completion, of the processes from “transition to the flash memory programming mode” to “signature verification (con command)”, and “termination of the flash memory programming mode (dcon command)”. The initial value is automatic (on). If this command is executed without an option, the current status is displayed (automatic (on) or manual (off)). The default setting is automatic (on).

on: The con command and dcon command are executed automatically.
off: The con command and dcon command are executed manually. When set to manual (off), the con command is executed, then the device command can be executed. Furthermore, various device commands can be executed multiple times. Execute the dcon command to terminate. Note that the ep (epv) command will automatically execute the con command and dcon command even if this is set to manual (off).

Example of usage

Command	Screen output
autocon	AutoCon is on / off
autocon on	AutoCon is on
autocon off	AutoCon is off

6.4.2. brt command

Confirms and changes the data transfer rate for serial communication with the host PC.

Input format

'brt' ('9600' | '19200' | '38400' | '57600' | '115200')

Description of the function

This command can be used with its options to change the data transfer rate for serial communications with the host PC. When the data transfer rate is changed, it will be necessary to change the data transfer rate of the COM port setting with HyperTerminal and reconnect.
If no options are used with this command, then the current data transfer rate will be displayed.
If the serial connector is connected, then the data transfer rate will be displayed.

If a USB connector is used, then the USB version will be displayed.

- USB (HS) ... USB 2.0
- USB (FS) ... USB 1.1

The default data transfer rate is 9600 bps.
9600: Changes the data transfer rate to 9600 bps.
19200: Changes the data transfer rate to 19200 bps.
38400: Changes the data transfer rate to 38400 bps.
57600: Changes the data transfer rate to 57600 bps.
115200: Changes the data transfer rate to 115200 bps.

Example of usage

Command	Screen output
brt	[When the serial connector is connected at 115200 bps] Current Baudrate is: 115200 [When the USB connector is connected at High speed] Current Baudrate is: USB (HS)
brt 9600	New Baudrate is: 9600
brt 19200	New Baudrate is: 19200
brt 38400	New Baudrate is: 38400
brt 57600	New Baudrate is: 57600
brt 115200	New Baudrate is: 115200

6.4.3. conf command

Displays a list of the information stored in the FP5 and changes the number of programming area sections.

Input format

'conf' ('progarea' '4x4' | '8x2'' | '10/6')

Description of the function

Divides the programming area into eight, four, or two areas depending on the selected option.
If an option is not specified, then the following information stored in the FP5 will be displayed.

- Version information (firmware version, board hardware version, FPGA version, serial number, FP5 mode)
- Program area information (area divisions, valid programming areas, maximum size of program file information (code area, data area))
- Program file information (file name, creation date, size, checksum)
- PR5 file and ESF file information in all programming areas (PR5 file names, PR5 file checksums, ESF file checksums)
- Automatic connection information
- Buzzer information
- Automatic power supply OFF information
- Security mode information
- FP5 manager option setting information

Progarea: Used to specify the number of programming area sections.
4x4: Divides the programming area into four sections.
8x2: Divides the programming area into eight sections.
10/6: Divides the programming area into two sections.

Example of usage

Refer to the following pages.

(1)

Command	Screen output
conf progarea 4x4	[If there are four sections before the command is executed] OK INFO: Same setting. Configuration is not changed. [If there are eight sections before the command is executed] OK INFO: New configuration has been set. INFO: Progarea data is not valid any more. Number of Program areas: 4 Active Program Area: 0 Size of Program Areas (Code / Data): Area 0: 0x400000 / 0x020000 Area 1: 0x400000 / 0x020000 Area 2: 0x400000 / 0x020000 Area 3: 0x400000 / 0x020000 Area Filename Date Time Range CRC *0 {unknown data} 1 {unknown data} 2 {unknown data} 3 {unknown data} Checking Progareas..... No invalid data found.

(2)

Command	Screen output
conf	See below.

```
Firmware Version Vx.xx
Board H/W Vx, FPGA Vx
Serial No.: xxxxxxxxxx
Standard mode unsecured

Number of Program areas: 4    Active Program Area: 0
Size of Program Areas (Code / Data):
Area 0: 0x400000 / 0x020000
Area 1: 0x400000 / 0x020000
Area 2: 0x400000 / 0x020000
Area 3: 0x400000 / 0x020000

Area  Filename                  Date        Time        Range          CRC
 *0   sample.hex               2006-02-24  21:13  000000-007FFF  61D5F67C

  1   {unknown data}

  2   {unknown data}

  3   {unknown data}

Checking Progareas.....
  No invalid data found.

Area  Parameter file       PR5 CRC   ESF CRC
 *0   78F1166              C8005840  D0401B9D
  1   {invalid}
  2   {invalid}
  3   {invalid}

AutoCon is off
Sound is on
AutoPowerOff is disabled
Security state is: Inactive
Authorization procedure is: Undefined
Manager option byte: 0x00
  HEX file Upload enabled
  Device Setup enabled
  Checksum comparison off
  Reset option Hi-z
```

6.4.4. downprm command

Downloads the PR5 file.

Input format

'downprm'

Description of the function

Downloads the PR5 file. After this command is executed, the PR5 file must be downloaded to the FP5 in ASCII format using communications software. If using HyperTerminal, select Transfer(T) -> Transfer text file(T)..., and then select the PR5 file.

Example of usage

Command	Status	Status LED	Message display	Screen output
downprm	Display after execution of the command (before downloading)	BUSY	*** BUSY ***	Now loading...
	Display during downloading	BUSY	*** BUSY ***	...
	Display after normal ending of the download	PASS	Returns to the display before executing the command.	PASS
	Display after error ending of the download	ERROR	Returns to the display before executing the command.	ERROR: <text>

6.4.5. downset command

Downloads the ESF file.

Input format

'downset'

Description of the function

Downloads the ESF file. After this command is executed, the ESF file must be downloaded to the FP5 in ASCII format using communications software. If using HyperTerminal, select Transfer(T) -> Transfer text file(T)..., and then select the ESF file.

Example of usage

Command	Status	Status LED	Message display	Screen output
downset	Display after execution of the command (before downloading)	BUSY	*** BUSY ***	Now loading...
	Display during downloading	BUSY	*** BUSY ***	...
	Display after normal ending of the download	PASS	Returns to the display before executing the command.	PASS
	Display after error ending of the download	ERROR	Returns to the display before executing the command.	ERROR: <text>

6.4.6. fcks command

Executes the programming GUI [File] menu -> [Checksum...] command.

Input format

'fcks' <type> <(code)start> <(code)end> (<data_start> <data_end> (<UB_start> <UB_end>))

Description of the function

Executes a similar function to the programming GUI [File] menu -> [Checksum...] command.
Specifies the calculation method, starting address and number of bytes in the options.

type:Specifies the calculation method.
crc: 32-bit CRC method
crc16: 16-bit CRC method
ari: 16-bit subtraction calculation method (When a V850, RL78, and 78K is selected)
32-bit subtraction calculation method (When a RX, RH850, SuperH, and R8C is selected)
k0s_sp: Division method (original)
start:The starting address is specified in hexadecimal. The code area, data area, and user boot area can be specified.
end: Specifies the end address in hexadecimal. The code area, data area, and user boot area can be specified.

Example of usage

Command	Screen output
fcks crc 0 3fffff	Checksum Code : 000000-3FFFFF = 26218DD4
fcks ari 0 3fffff	Checksum Code : 000000-3FFFFF = 61C0
fcks k0s_sp 0 3fffff	Checksum Code : 000000-3FFFFF = 060E
fcks ari 0 3fffff 400000 41ffff	Checksum Code : 000000-3FFFFF = 61C0 Checksum Data : 400000-41FFFF = 0200 Checksum Total : 63C0

6.4.7. files command

Displays the information concerning the program file that was downloaded to the FP5.

Input format

'files' ('check')

Description of the function

If no options are used, then information (file name, creation date, size, checksum) concerning the program file downloaded to the FP5 is displayed.

check: The checksum of all programming areas stored in the program file, from START to END, is recalculated with the 32-bit CRC method, and cross-checked with the checksum stored in the FP5 during download.

Example of usage

Command	Screen output
Files	Area Filename Date Time Range CRC *0 sample.hex 2006-02-24 21:13 000000-007FFF 61D5F67C 1 {unknown data} 2 {unknown data} 3 {unknown data}
files check	Area Filename Date Time Range CRC *0 sample.hex 2006-02-24 21:13 000000-007FFF 61D5F67C 1 {unknown data} 2 {unknown data} 3 {unknown data} Checking Progareas..... No invalid data found.

6.4.8. fpga_up command

Updates the FPGA.

Input format

'fpga_up'

Description of the function

Updates the FPGA version. After this command is executed, the FPGA file must be downloaded to the FP5 in ASCII format using communications software. If using HyperTerminal, select Transfer(T) -> Transfer text file(T)..., and then select the FPGA file. After the FPGA version has been updated, the FP5 power supply will be automatically turned off.

Example of usage

Command	Status	Status LED	Message display	Screen output
fpga_up	Display after executing the command (before downloading) Press y to continue. Press n to cancel.	Off	*** BUSY ***	Are you sure, you want to update the FPGA (y/n)?
	Display after pressing y	Off	*** BUSY ***	Preparing storage ...OK Now loading...
	Display during download	Off	*** BUSY ***	...
	Display after end of normal download Press y to continue. Press n to cancel.	Off	*** BUSY ***	Refer to <1> below.
	Display after pressing y	Off	Programming FPGA	Refer to <2> below.

<1>
OK

**** CAUTION ****
Now the FPGA will be written.
Please ensure that:
- the correct FPGA Update file has been downloaded
- the Power is NOT disconnected during this operation
- the Programmer is NOT reset during this operation

Do you want to continue (y/n)?

<2>
Starting FPGA programming...
100% done
FPGA Update succeeded.

PG-FP5 Power will be switched OFF now....

6.4.9. hex command

Uploads the program file in Intel HEX format.

Input format

'hex' ((<code_start address> <code_length>) (<data_start address> <data_length>) (<UB_start address> <UB_length>))

Description of the function

If a program file has been downloaded to a valid programming area, executing this command will upload the program file in Intel HEX format. If this command is executed without any options, the upload will be executed with the address size used during downloading. If a program has not been downloaded, then "Invalid argument" will be displayed. The starting address and number of bytes are designated as options.

start address: The starting address is designated as a hexadecimal number. The code area, data area, and user boot area can be specified.
length: The number of bytes is designated as a hexadecimal number. The code area, data area, and user boot area can be specified.

Example of usage

Command	Screen output
hex	Press 'return' to start/continue output.
hex 0 3fff	Press 'return' to start/continue output.
hex 0 3ffff 400000 20000	Press 'return' to start/continue output.
After the command is executed, pressing the Return key will start the upload. See below. :20000000810081008100810081008100810081008100810081008100810081008100D0 :20002000810081008100810081008100810081008100810081008100810081008100FFFF33 : :00000001FF	

6.4.10. hlp command

Lists available commands with brief descriptions.

Input format

'hlp'

Description of the function

Lists frequently-used commands with brief descriptions.

Example of usage

Command	Screen output
hlp	See below.

```
---------- Control commands ----------
downprm/downset : Download parameter/customer settings
upprm  /upset       : Upload parameter/customer settings
lod         : Download Intel Hex or Motorola S-record file
hex/srec        : Upload Intel Hex / Motorola S-record file
progarea        : Change Progam area
files               : Show downloaded HEX/SREC files in FP5 memory
prm                 : Show Parameter file (PRM/SET) information
conf            : Show / Modify FP5 configuration
security        : Show / Modify FP5 Security settings
brt             : Set baudrate to host
fcks            : Calculate file checksum (FP5 memory)
fill            : Fill memory
ver             : Show firmware version
res             : Reset FP5
pwr_off         : Switch OFF FP5 immediately / set auto Power OFF
sound           : Enable / Disable sound generation
trc                 : Show Device communication trace
version_up      : Update firmware version
fpga_up         : Update FPGA version
selftest        : Perform a Selfcheck
 ---------- Device commands ----------
bln             : Blankcheck
ers             : Erase
prg             : Program
vrf                 : Verify
read            : Read
ep              : Erase and Program
sig             : Show device signature
sum             : Get device checksum
scf             : Set security information
```

6.4.11. lod command

Downloads program files.

Input format

'lod' ('add') ('fname="filename"') ('ftime="date and time"')

Description of the function

Downloads the program file to a valid programming area. After this command is executed, the program file must be downloaded to the FP5 in ASCII format using communications software. If using HyperTerminal, select Transfer(T) -> Transfer text file(T)..., and then select the program file. The options are to delete or not to delete the file before downloading, the file name, and the creation date. If this command is executed without any options, then the file name and creation date will not be stored.

add
Select this not to delete the data in the valid programming area before downloading program files. When this is not designated, the data will be deleted. Please use this option when downloading and writing two program files. Usually, this is not designated.

NoteWhen this option is enabled and the lod command is executed, the PG-FP5 downloads data 512 bytes at a time without erasing its internal flash memory. Note, however, that the download error “ERROR: NAND flash – Illegal Write (Bit 0->1)” occurs if there is data other than FFh in the data being downloaded.

fname = “filename”
Designates the file name of the program file that is downloaded. The maximum number of characters is 31.
ftime = “date and time”
Designates the creation date and time of the downloaded program file. The format is YYYY-MM-DD HH:MM.
YYYY: Year; MM: Month; DD: Date; HH: Hour; MM: Minute

Example of usage

Command	Status	Status LED	Message display	Screen output
lod	Display after execution of the command (before downloading)	BUSY	*** BUSY ***	Preparing storage ....PASS Now loading...
	Display during downloading	BUSY	*** BUSY ***	...
	Display after normal ending of the download	PASS	Returns to the display before executing the command.	PASS
	Display after error ending of the download	ERROR	Returns to the display before executing the command.	ERROR: <text>
Address range: 0x000000 to 0x007FFF, CRC32: 0x61D5F67C PASS				

Command	Operation
lod fname="sample.hex" ftime="2006-02-24 21:13"	Same operation as lod
lod add	Same operation as lod

6.4.12. prm command

Displays the information concerning the PR5 file and ESF file that were downloaded to the FP5.

Input format

'prm'

Description of the function

Displays the information concerning the PR5 file and ESF file (PR5 file name, PR5 checksum, ESF file checksum) that were downloaded to all the programming areas of the FP5.

Example of usage

Command	Screen output
prm	Area Parameter file PR5 CRC ESF CRC *0 78F1166 C8005840 D0401B9D 1 {invalid} 2 {invalid} 3 {invalid}

6.4.13. progarea command

Confirms, changes and deletes data from valid programming areas.

Input format

'progarea' ('clear' '0' | '1' | '2' | '3' | '4' | '5' | '6' | '7') | ('0' | '1' | '2' | '3' | '4' | '5' | '6' | '7')

Description of the function

The valid programming area can be changed by designating a numerical option. Also, by designating the clear option, the data in the valid programming area (PR5 file, ESF file, and program file) can be deleted. If there are no options, then the current valid programming area is displayed.

clear: Clears the data in the valid programming area (PR5 file, ESF file, and program file).
0: Changes the valid programming area to 0.
1: Changes the valid programming area to 1.
2: Changes the valid programming area to 2.
3: Changes the valid programming area to 3.

Example of usage

Command	Screen output
progarea	Active Program Area: 0 Max. program size: 4 MByte Max. data size: 512 kByte
progarea clear 1	
progarea 0	Active Program Area: 0

6.4.14. pwr_off command

Turns off the FP5 power supply.

Input format

'pwr_off' ('now' | 'auto' ('off' | <time [minutes]>))

Description of the function

Turns off the FP5 power supply. Adjusts the off timing by designating the options. If options are not used, then the user can see if automatic power supply off is enabled or disabled.

now: Turns off the power supply immediately.
auto: After the designated time has elapsed, automatic power supply off is enabled. Once this is designated, even if the automatic power supply turns off, it will still be enabled if set to ON.
off: After the designated time has elapsed, automatic power supply off is disabled.
time: Designates the automatic power supply off time. The time can be 1 to 35791394 (in minutes). Note that 1 to 4 are set to 5 minutes.

Example of usage

Command	Screen output
pwr_off	AutoPowerOff is disabled
pwr_off now	PG-FP5 Power will be switched OFF now....
pwr_off auto 10	AutoPowerOff is enabled, time is 10 min.

6.4.15. res command

Resets FP5.

Input format

'res'

Description of the function

Executes a function similar to the programming GUI [Programmer] menu -> [Reset] command.

Example of usage

Command	Screen output
res	FFFFFFF PPPPP 555555 F P P 5 F P P 5 F P P 55555 FFFFF PPPPP 5 F P 5 F P 5 F P 5 5 F P 5555 Firmware Version Vx.xx Board H/W Vx, FPGA Vx Serial No.:xxxxxxxxxx Standard mode unsecured

6.4.16. security command

Confirms the security state that can be set by the [FP5 Manager] command.

Input format

'security'

Description of the function

Confirms the security state that can be set by the [FP5 Manager] command.

Example of usage

Command	Screen output
security	[When password-protection is valid] Security state is: Locked Authorization procedure is: Password [When password-protection is invalid] Security state is: Inactive Authorization procedure is: Undefined

6.4.17. selftest command

Executes a self-test.

Input format

'selftest'

Description of the function

Executes a function similar to the programming GUI [Programmer] menu -> [Self-Test] command.

Example of usage

Command	Screen output
selftest	***** CAUTION ***** Remove any plugs from Target- and Remote-Connector before starting. Any hardware attached to those connectors may be damaged by this test ! ***** CAUTION ***** Target- and Remote-connector unplugged ? If yes, press 's' to start the test: s FPGA Test: PASS Power Supply Test: PASS Target- and Remote-Interface Test: PASS Selftest PASSED.

6.4.18. serno command

Sets the unique code for embedding in the program file.

Input format

'serno' <start address> <pattern>

Description of the function

Sets the unique code for embedding in the program file. This command becomes available when the serial number mode (function for embedding a unique code) is enabled by the FP5 Manager setting. Executing this command sets the unique code in the body of the FP5. The next time a device command that handles the program file (such as ep, prg, and vrf) is executed, the unique code is embedded at the specified address in the program file. The setting of the unique code in the FP5 is cleared on completion of the device command.

Start address: Specifies the start address in hexadecimal.
Pattern: Specifies the unique code in hexadecimal notation. A maximum of 64 bytes can be specified.

Example of usage

Command	Screen output
serno 8000 00010203	OK

6.4.19. sound command

Sets the buzzer.

Input format

'sound' ('off' | 'on')

Description of the function

Sets the buzzer. “Enabled” or “disabled” is optionally designated. If no option is designated, the current setting is displayed.

off: Disables the buzzer.
on: Enables the buzzer.

Example of usage

Command	Screen output
sound	Sound is on
sound off	Sound is off

6.4.20. srec command

Uploads the program file in Motorola HEX format.

Input format

'srec' ((<code_start address> <code_length>) (<data_start address> <data_length>) (<UB_start address> <UB_length>))

Description of the function

If a program file has been downloaded to a valid programming area, executing this command will upload the program file in Motorola HEX format. If this command is executed without any options, the upload will be executed with the address size used during downloading. If a program has not been downloaded, then "Invalid argument" will be displayed. The starting address and number of bytes are designated as options.

start address: The starting address is designated as a hexadecimal number. The code area, data area, and user boot area can be specified.
length: The number of bytes is designated as a hexadecimal number. The code area, data area, and user boot area can be specified.

Example of usage

Command	Screen output
srec	Press 'return' to start/continue output.
srec 0 3fff	Press 'return' to start/continue output.
srec 0 3ffff 400000 20000	Press 'return' to start/continue output.
After the command is executed, pressing the Return key will start the upload. S0030000FC S3250000000081008100810081008100810081008100810081008100810081008100810081008100CA S3250000002081008100810081008100810081008100810081008100810081008100810081008100FFFF2D : S5030000FC S70500000000FA	

6.4.21. trc command

Displays the communication information between the FP5 and target device.

Input format

'trc'

Description of the function

Displays the communication information between the FP5 and target device stored in the FP5 trace memory. Up to 1024 lines can be stored.
The FP5 has ring structure trace memory.

Example of usage

Command	Screen output
trc	See below.

```
Debug Output
Number   Time us     Send  Rec.
  :
0214    0008675924    17     --
0215    0008678930     --     02
  :
Total number of transmitted bytes : 266282
Total number of received bytes :     006212
```

6.4.22. upprm command

Uploads the PR5 file.

Input format

'upprm'

Description of the function

If the PR5 file has been downloaded to a valid programming area, then executing this command will upload the PR5 file.

Example of usage

Command	Screen output
upprm	Press 'return' to start/continue output.

```
After the command is executed, pressing the Return key will start the upload.
[FlashProParameterFile]
  :
[CHECKSUM]
SUM=BA9F0491
[EOF]
```

6.4.23. upset command

Uploads the ESF file.

Input format

'upset'

Description of the function

If the ESF file has been downloaded to a valid programming area, then executing this command will upload the ESF file.

Example of usage

Command	Screen output
upset	Press 'return' to start/continue output.
After the command is executed, pressing the Return key will start the upload. [FlashproCustomerSettingFile] : [CHECKSUM] SUM=F7D4A9E7 [EOF]	

6.4.24. ver command

Displays the FP5 version.

Input format

'ver'

Description of the function

Displays the FP5 version (firmware version, board hardware version, FPGA version, and serial number).

Example of usage

Command	Screen output
ver	Firmware Version Vx.xx Board H/W Vx, FPGA Vx Serial No.:xxxxxxxxxx Standard mode unsecured

6.4.25. version_up command

Updates the firmware.

Input format

'version_up'

Description of the function

Upgrades the firmware. After this command is executed, the firmware file must be downloaded to the FP5 in ASCII format using communications software. If using HyperTerminal, select Transfer(T) -> Transfer text file(T)..., and then select the firmware file. After the firmware version has been updated, the FP5 will be reset.

Example of usage

Refer to the following pages.

Command	Status	Status LED	Message display	Screen output
version_up	Display after executing the command (before downloading) Press y to continue. Press n to cancel.	Off	*** BUSY ***	Are you sure, you want to update the Firmware (y/n)?
	Display after pressing y	Off	*** BUSY ***	Preparing storage ...OK Now loading...
	Display during download	Off	*** BUSY ***	...
	Display after end of normal download Press y to continue. Press n to cancel.	Off	*** BUSY ***	Refer to <1> below.
	Display after pressing y	Off	Selfprogramming Firmware	Refer to <2> below.

<1>

OK

**** CAUTION ****

Now the Firmware will be written.

Please ensure that:

- the correct Firmware Update file has been downloaded
- the Power is NOT disconnected during this operation
- the Programmer is NOT reset during this operation

Do you want to continue (y/n)?

```
<2>
FP5 Selfprogramming Vx.xx
  Checking FLMD0 level.. OK.
  Erase flash.. OK.
  Blank check.. OK.
  Write flash..... OK.
  Margin check.. OK.
  Verify..... OK.
Firmware Update succeeds.

Restarting FP5..


FFFFFFF  PPPPP    555555
 F       P    P   5
 F       P     P  5
 F       P    P   55555
 FFFFF   PPPPP        5
 F       P            5
 F       P             5
 F       P         5   5
 F       P          5555


Firmware Version Vx.xx
Board H/W Vx, FPGA Vx
Serial No.:xxxxxxxxxx
Standard mode unsecured
```

6.5. Description of The FP5 Device Commands

This section describes the FP5 device commands.

6.5.1. bln command

Executes [Blank check] command.

Input format

'bln'

Description of the function

Executes a similar function to the programming GUI [Device] menu -> [Blank check] command.

Example of usage

Command	Status	Status LED	Message display	Screen output
bln	Display while executing the command [Chip mode]	BUSY	Blank chk. Chip ...	Blank check User area: ERROR Blank check User Boot area: Blank check Data area:
	Display while executing the command [Block mode]	BUSY	Blank chk. Block ...	
	Display while executing the command [Area mode]	BUSY	Blank chk. Area ...	
	Display after executing the command [For blank devices]	PASS	Returns to the display before executing the command.	PASS Blank check operation finished.
	Display after executing the command [For not blank devices]	ERROR	ERROR: 051 Blank chk failed	ERROR(E051): Not Blank. Blank check operation finished.

6.5.2. clr command

Executes the Configuration clear.

Input format

'clr'

Description of the function

Executes the Configuration clear.

Example of usage

Command	Status	Status LED	Message display	Screen output
clr	Display after executing the command [When completed normally]	PASS	Returns to the display before executing the command.	Configuration clear : PASS Configuration clear operation finished.
	Display after executing the command [When terminated abnormally]	ERROR	ERROR: xxx xxxxxxxxxxxxxxxx	ERROR(Exxx): <text>

6.5.3. con command

Executes the processes from “transition to the flash memory programming mode” to “signature verification”.

Input format

'con'

Description of the function

Executes the processes from “transition to the flash memory programming mode” to “signature verification”. In order to use this command, “manual” (off) must be set with the autocon command beforehand.

Example of usage

Command	Status	Status LED	Message display	Screen output
con	Display while executing the command	BUSY	Connecting:	
	Display after executing the command [When completed normally]	PASS	Returns to the display before executing the command.	PASS Dxxxxxxx>
	Display after executing the command [When terminated abnormally]	ERROR	ERROR: xxx xxxxxxxxxxxxxxx	ERROR(Exxx): <text>

6.5.4. dcon command

Executes the process to end the flash memory programming mode.

Input format

'dcon'

Description of the function

Executes the process to end the flash memory programming mode. In order to use this command, "manual" (off) must be set with the autocon command beforehand.

Example of usage

Command	Status	Status LED	Message display	Screen output
con	Display while executing the command	BUSY	Disconnecting:	
	Display after executing the command	PASS	Returns to the display before executing the command.	Device disconnected.

6.5.5. ep/epv command

Executes [Autoprocedure(E.P.)] command.

Input format

'ep' or 'epv'

Description of the function

Executes a similar function to the programming GUI [Device] menu -> [Autoprocedure(E.P.)] command.

Example of usage

Command	Status	Status LED	Message display	Screen output
ep or epv	Display while executing the command	BUSY		Blank check Skipped. Erase Chip: PASS Program Chip: 10% 20% : 100%
	Display after executing the command [When completed normally]	PASS	Returns to the display before executing the command.	PASS Erase,Program operation finished. or PASS EPV operation finished.
	Display after executing the command [When terminated abnormally]	ERROR	ERROR: xxx xxxxxxxxxxxxxxxx	ERROR(Exxx): <text> Erase,Program operation finished. or ERROR(Exxx): <text> EPV operation finished.

6.5.6. ers command

Executes [Erase] command.

Input format

'ers'

Description of the function

Executes a similar function to the programming GUI [Device] menu -> [Erase] command.

Example of usage

Command	Status	Status LED	Message display	Screen output
ers	Display while executing the command [Chip mode]	BUSY	Erase Chip ...	Erase Chip:
	Display while executing the command [Block mode]	BUSY	Erase Block ...	
	Display while executing the command [Area mode]	BUSY	Erase Area ...	
	Display after executing the command [When completed normally]	PASS	Returns to the display before executing the command.	PASS Erase operation finished.
	Display after executing the command [When terminated abnormally]	ERROR	ERROR: xxx xxxxxxxxxxxxxxx	ERROR(Exxx): <text> Erase operation finished.

6.5.7. gdi command

Get the information of blank check and flash option.

Input format

'gdi'

Description of the function

Obtains the information set by executing the [Get Flash options] command on the [Device] menu of the programming GUI.

Example of usage

Command	Status	Status LED	Message display	Screen output
gdi	Display after executing the command [When completed normally]	PASS	Returns to the display before executing the command.	See below.
	Display after executing the command [When terminated abnormally]	ERROR	ERROR: xxx xxxxxxxxxxxxxxx	ERROR(Exxx): <text>

Blank check
CF1: FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF
UB: FF
DF:
FFFFFFFFFFFFFFFFFFFF

Command protection: xx
ID code : ID code (ID0,ID1,…,ID15)
Lock Bits:
CF1: Lock Bits of Code Flash-1 *
CF2: Lock Bits of Code Flash-2 *
UB: Lock Bit of User Boot *
OTP flags:
CF1: OTP of Code Flash-1 *
CF2: OTP of Code Flash-2 *
UB: OTP of User Boot *
OFS: OFS0 OFS1
Endianness: Little Endian / Big Endian

* Blank check (Not Blank = 0, Blank = 1), Lock Bits / OTP (Set = 0, Unset = 1)
Bit 0 of 1st byte : Block 0
Bit 1 of 1st byte : Block 1
:
Bit 7 of 1st byte : Block 7
Bit 0 of 2nd byte : Block 8
:

6.5.8. ged command

Get the information of endian.

Input format

'ged'

Description of the function

Get the information of endian.

Example of usage

Command	Status	Status LED	Message display	Screen output
ged	Display after executing the command [When completed normally]	PASS	Returns to the display before executing the command.	Get Endianess Little Endian PASS Get Endianess operation finished. [Format] Endianness: Little Endian / Big Endian
	Display after executing the command [When terminated abnormally]	ERROR	ERROR: xxx xxxxxxxxxxxxxxx	ERROR(Exxx): <text>

6.5.9. gid command

Get the ID code.

Input format

'gid'

Description of the function

Obtains the information set by executing the [Set ID code] command on the [Device] menu of the programming GUI.

Example of usage

Command	Status	Status LED	Message display	Screen output
gid	Display after executing the command [When completed normally]	PASS	Returns to the display before executing the command.	[Display example] ID code : xxxxxxxxxxxxxxxxxxxxxxxx PASS ID code operation finished.
	Display after executing the command [When terminated abnormally]	ERROR	ERROR: xxx xxxxxxxxxxxxxxx	ERROR(Exxx): <text>

6.5.10. glb command

Get the lock bit.

Input format

'glb'

Description of the function

Get the lock bit.

Example of usage

Command	Status	Status LED	Message display	Screen output
glb	Display after executing the command [When completed normally]	PASS	Returns to the display before executing the command.	See below.
	Display after executing the command [When terminated abnormally]	ERROR	ERROR: xxx xxxxxxxxxxxxxxx	ERROR(Exxx): <text>

LockBits :
CF1: FFFF

6.5.11. gob command

Get the information of option byte.

Input format

'gob'

Description of the function

Obtains the information set by executing the [Set Option bytes] command on the [Device] menu of the programming GUI.

Example of usage

Command	Status	Status LED	Message display	Screen output
gob	Display after executing the command [When completed normally]	PASS	Returns to the display before executing the command.	See below.
	Display after executing the command [When terminated abnormally]	ERROR	ERROR: xxx xxxxxxxxxxxxxxx	ERROR(Exxx): <text>
Option Bytes : FFFFFFFF FFFFFFFF FFFFFFFF FFFFFFFF FFFFFFFF FFFFFFFF FFFFFFFF FFFFFFFF PASS Option Bytes operation finished. [Format] Option Bytes : OPBT0 OPBT1 … OPBT7				

6.5.12. gof command

Get the information of OFS.

Input format

'gof'

Description of the function

Get the information of OFS.

Example of usage

Command	Status	Status LED	Message display	Screen output
gof	Display after executing the command [When completed normally]	PASS	Returns to the display before executing the command.	Get OFS OFS: FFFFFFFF FFFFFFFF PASS Get OFS operation finished. [Format] OFS: OFS0 OFS1
	Display after executing the command [When terminated abnormally]	ERROR	ERROR: xxx xxxxxxxxxxxxxxx	ERROR(Exxx): <text>

6.5.13. gos command

Get the information of flash option.

Input format

'gos'

Description of the function

Obtains the information set by executing the [Get Flash options] command on the [Device] menu of the programming GUI.

Example of usage

Command	Status	Status LED	Message display	Screen output
gos	Display after executing the command [When completed normally]	PASS	Returns to the display before executing the command.	Security Flag: xx Boot Block Number: xx FS area: xxxx - xxxx OCD-ID : xxxxxxxxxxxxxxxxxxxxxxxx Option Bytes : xxxxxxxx PASS Get Option Setting operation finished.
	Display after executing the command [When terminated abnormally]	ERROR	ERROR: xxx xxxxxxxxxxxxxxx	ERROR(Exxx): <text>

6.5.14. got command

Get the information of OTP.

Input format

'got'

Description of the function

Get the information of OTP.

Example of usage

Command	Status	Status LED	Message display	Screen output
got	Display after executing the command [When completed normally]	PASS	Returns to the display before executing the command.	See below.
	Display after executing the command [When terminated abnormally]	ERROR	ERROR: xxx xxxxxxxxxxxxxxx	ERROR(Exxx): <text>

OTP flags :
CF1:
FFFF

6.5.15. gsc command

Get the information of security.

Input format

'gsc'

Description of the function

Obtains the information set by executing the [Set Security] command on the [Device] menu of the programming GUI.

Example of usage

Command	Status	Status LED	Message display	Screen output
gsc	Display after executing the command [When completed normally]	PASS	Returns to the display before executing the command.	Security Flag: xx Boot Block Number: xx FS area: xxxx – xxxx PASS Security operation finished.
	Display after executing the command [When terminated abnormally]	ERROR	ERROR: xxx xxxxxxxxxxxxxxx	ERROR(Exxx): <text>

6.5.16. idc command

Executes the ID code setting.

Input format

'idc'

Description of the function

Executes the ID code setting.

Example of usage

Command	Status	Status LED	Message display	Screen output
idc	Display after executing the command [When completed normally]	PASS	Returns to the display before executing the command.	Set OCD-ID PASS OCD-ID operation finished. or Set ID code PASS ID code operation finished.
	Display after executing the command [When terminated abnormally]	ERROR	ERROR: xxx xxxxxxxxxxxxxxx	ERROR(Exxx): <text>

6.5.17. opb command

Executes the [Set Option bytes] command.

Input format

'opb'

Description of the function

Obtains the information set by executing the [Set Option bytes] command on the [Device] menu of the programming GUI.

Example of usage

Command	Status	Status LED	Message display	Screen output
opb	Display after executing the command [When completed normally]	PASS	Returns to the display before executing the command.	Set Option bytes PASS Option bytes operation finished.
	Display after executing the command [When terminated abnormally]	ERROR	ERROR: xxx xxxxxxxxxxxxxxx	ERROR(Exxx): <text>

6.5.18. otp command

Executes the OTP setting.

Input format

'otp'

Description of the function

Executes the OTP setting.

Example of usage

Command	Status	Status LED	Message display	Screen output
otp	Display after executing the command [When completed normally]	PASS	Returns to the display before executing the command.	Set OTP protection PASS Set OTP operation finished.
	Display after executing the command [When terminated abnormally]	ERROR	ERROR: xxx xxxxxxxxxxxxxxx	ERROR(Exxx): <text>

6.5.19. prg command

Executes [Program] command.

Input format

'prg'

Description of the function

Executes a similar function to the programming GUI [Device] menu -> [Program] command.

Example of usage

Command	Status	Status LED	Message display	Screen output
prg	Display while executing the command [Chip mode]	BUSY	Program Chip Addr: 0x000000	Program Chip: 10% 20% : 100%
	Display while executing the command [Block mode]	BUSY	Program Block Addr: 0x000000	
	Display while executing the command [Area mode]	BUSY	Program Area Addr: 0x000000	
	Display after executing the command [When completed normally]	PASS	Returns to the display before executing the command.	PASS Program operation finished.
	Display after executing the command [When terminated abnormally]	ERROR	ERROR: xxx xxxxxxxxxxxxxxxx	ERROR(Exxx): <text> Program operation finished.

6.5.20. read command

Executes [Read] command.

Input format

'read' ('hex' | 'srec') (<start_address> <end_address>)

Description of the function

Executes a similar function to the programming GUI [Device] menu -> [Read] command.
hex: Executes [Read] with the Intel HEX format.
srec: Executes [Read] with the Motorola HEX format.
If neither hex nor srec is designated, then the [Read] will be executed in hexadecimal format.
start_address: Designates the starting address with a hexadecimal number.
end_address: Designates the ending address with a hexadecimal number.

If neither the start_address nor end_address options are used, then [Read] will be executed for the range set in the Operation mode. Use as the start address and end address the start address of an arbitrary block and the end address of an arbitrary block of the target device.

Example of usage

Command	Status	Status LED	Message display	Screen output
read	Display after executing the command	BUSY	Read	Press 'return' to start/continue output.
	Display after pressing the Return key	BUSY	Read Addr: 0x000000	See below.
	Display after [Read] ends [When completed normally]	PASS	Returns to the display before executing the command.	PASS Read operation finished.
	Display after [Read] ends [When terminated abnormally]	ERROR	ERROR: xxx xxxxxxxxxxxxxxx	ERROR(Exxx): <text>

<In the case of read hex 0 1000>
:10000000FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF00
:10001000FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF0
:
:100FF000FFFFFFFFFFFFFFFFFFFFFFFFFFFFFF01
:00000001FF

<In the case of read srec 0 1000>
S0030000FC
S31500000000FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFA
S31500000010FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFEA
:
S31500000FF0FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFB
S70500000000FA

<In the case of read 0 1000>
000000: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
000010: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
:
000FF0: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF

6.5.21. scf command

Executes [Set Security] command.

Input format

'scf'

Description of the function

Executes a similar function to the programming GUI [Device] menu -> [Set Security] command.

Example of usage

Command	Status	Status LED	Message display	Screen output
scf	Display after executing the command [When completed normally]	PASS	Returns to the display before executing the command.	Set Security Flags PASS Security operation finished. or Set command protection PASS Set comm. prot. operation finished.
	Display after executing the command [When terminated abnormally]	ERROR	ERROR: xxx xxxxxxxxxxxxxxx	ERROR(Exxx): <text>

6.5.22. sed command

Executes the endian setting.

Input format

'sed'

Description of the function

Executes the endian setting.

Example of usage

Command	Status	Status LED	Message display	Screen output
sed	Display after executing the command [When completed normally]	PASS	Returns to the display before executing the command.	Set Endianness PASS Set Endianness operation finished.
	Display after executing the command [When terminated abnormally]	ERROR	ERROR: xxx xxxxxxxxxxxxxxx	ERROR(Exxx): <text>

6.5.23. sid command

Sets the ID code and enables ID authentication in the serial programming mode.

Input format

'sid'

Description of the function

Sets the ID code and enables ID authentication in the serial programming mode.

Example of usage

Command	Status	Status LED	Message display	Screen output
sid	Display after executing the command [When completed normally]	PASS	Returns to the display before executing the command.	Set Serial Programming ID PASS Serial Progr. ID operation finished.
	Display after executing the command [When terminated abnormally]	ERROR	ERROR: xxx xxxxxxxxxxxxxxx	ERROR(Exxx): <text>

6.5.24. sig command

Executes [Signature read] command.

Input format

'sig'

Description of the function

Executes a similar function to the programming GUI [Device] menu -> [Signature read] command.

Example of usage

Command	Status	Status LED	Message display	Screen output
sig	Display while executing the command	BUSY	Signature:	Device name: Dxxxxxxxxx Device data: xx xx xx xx Device end addr: xxxxxxxx Security Flag: xxxx Boot Block Number: xxxx Device Version: x.xx Firmware Version: x.xx
	Display after executing the command [When completed normally]	PASS	Returns to the display before executing the command.	PASS Signature operation finished.
	Display after executing the command [When terminated abnormally]	ERROR	ERROR: xxx xxxxxxxxxxxxxxx	ERROR(Exxx): <text>

6.5.25. slb command

Executes the Lock bits setting.

Input format

'slb'

Description of the function

Executes the Lock bits setting.

Example of usage

Command	Status	Status LED	Message display	Screen output
slb	Display after executing the command [When completed normally]	PASS	Returns to the display before executing the command.	Set LockBits PASS LockBits operation finished.
	Display after executing the command [When terminated abnormally]	ERROR	ERROR: xxx xxxxxxxxxxxxxxxx	ERROR(Exxx): <text>

6.5.26. spd command

Executes the disable serial programming setting.

Input format

'spd'

Description of the function

Executes the disable serial programming setting.

Example of usage

Command	Status	Status LED	Message display	Screen output
spd	Display after executing the command [When completed normally]	PASS	Returns to the display before executing the command.	Set Serial Programming Disable PASS Set SerProgDis operation finished.
	Display after executing the command [When terminated abnormally]	ERROR	ERROR: xxx xxxxxxxxxxxxxxxx	ERROR(Exxx): <text>

6.5.27. sum command

Executes the programming GUI [Device] menu -> [Checksum] command.

Input format

'sum'

Description of the function

Executes a similar function to the programming GUI [Device] menu -> [Checksum] command.

Example of usage

Command	Status	Status LED	Message display	Screen output
sum	Display after executing the command [When completed normally]	PASS	Checksum: xxxx	0xxxxx PASS Checksum operation finished.
	Display after executing the command [When terminated abnormally]	ERROR	ERROR: xxx xxxxxxxxxxxxxxx	ERROR(Exxx): <text>

6.5.28. vrf command

Executes [Verify] command.

Input format

'vrf'

Description of the function

Executes a similar function to the programming GUI [Device] menu -> [Verify] command.

Example of usage

Command	Status	Status LED	Message display	Screen output
vrf	Display while executing the command [Chip mode]	BUSY	Verify Chip Addr: 0x000000	Verify Chip: 10% 20% : 100%
	Display while executing the command [Block mode]	BUSY	Verify Block Addr: 0x000000	
	Display while executing the command [Area mode]	BUSY	Verify Area Addr: 0x000000	
	Display after executing the command [When completed normally]	PASS	Returns to the display before executing the command.	PASS Verify operation finished.
	Display after executing the command [When terminated abnormally]	ERROR	ERROR: xxx xxxxxxxxxxxxxxx	ERROR(Exxx): <text> Verify operation finished.

7. CONNECTORS AND CABLES

This chapter explains connectors and cables.

7.1. Power Supply Connector

The power supply connector is laid out on the host interface side of the FP5.

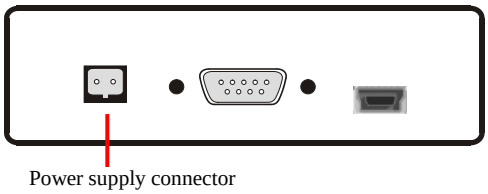


Figure 7.1 Power Supply Connector <FP5 Host Interface Side>

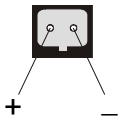


Figure 7.2 Power Supply Connector Pin Assignment

Note Do not connect an AC adaptor other than the one for the PG-FP5 to the power supply connecter.

7.2. Serial Connector

The serial connector (9-pin D-SUB male connector) is laid out on the host interface side of the FP5.

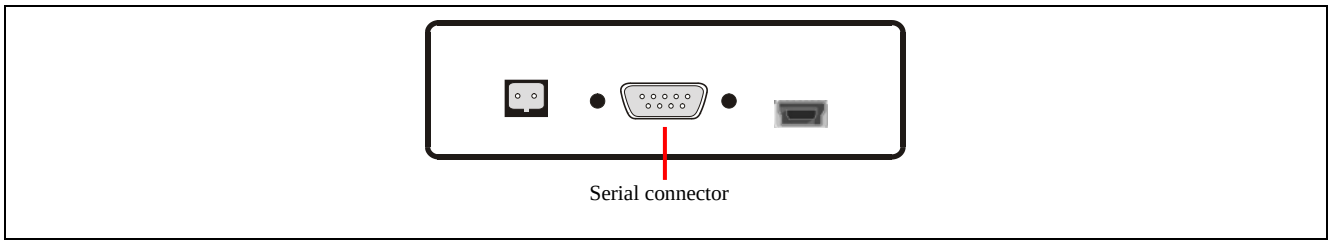


Figure 7.3 Serial Connector <FP5 Host Interface Side>

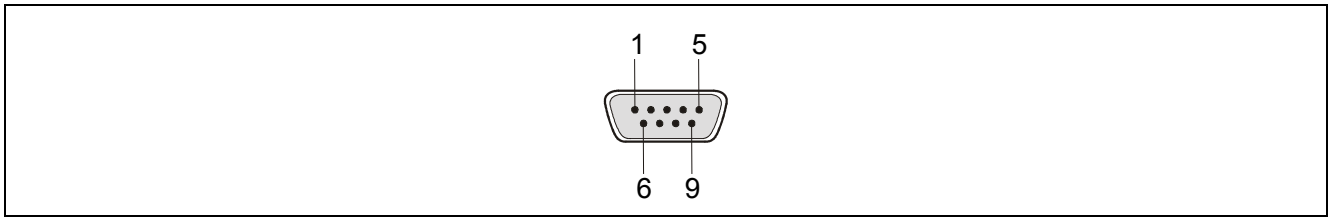


Figure 7.4 Serial Connector Pin Assignment

Table 7.1 Serial Connector Pin Configuration

Serial Connector	Signal Name
1	NC
2	RxD
3	TxD
4	NC
5	VSS
6	NC
7	RTS
8	CTS
9	NC

Note Part number of serial connector (9-pin D-SUB male connector): 070430MB009G200ZU (Suyin Connector Corp.)

7.2.1. Serial cable

The host cable is a standard shielded serial cable (crossed) approximately 3 meters long. The connectors on both sides are 9-pin D-SUB female connectors. The following shows the connection.

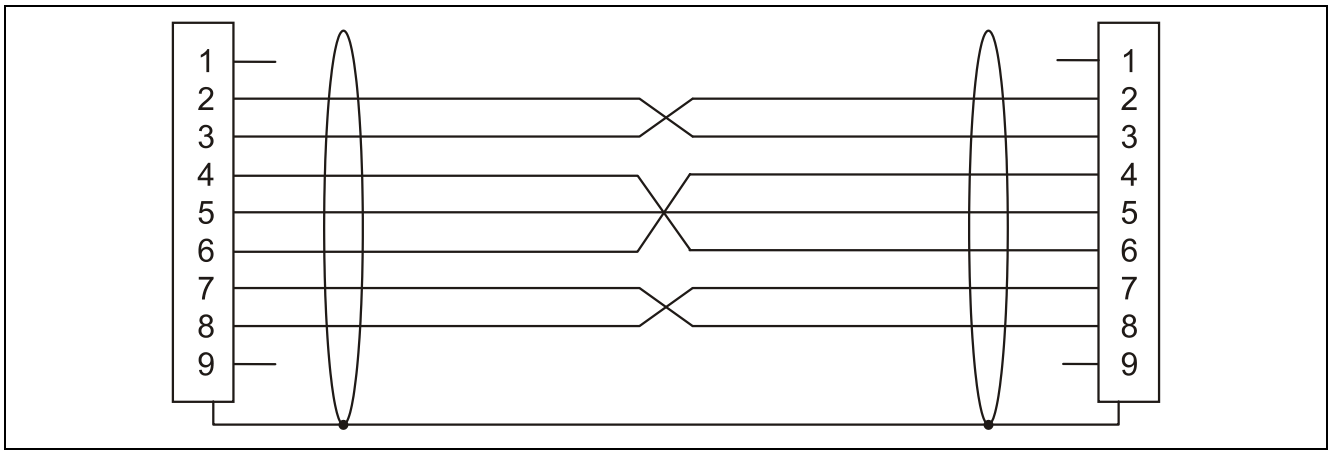


Figure 7.5 Serial Cable Connection

7.3. USB Connector

The mini-B type USB connector is laid out on the host interface side of the FP5.

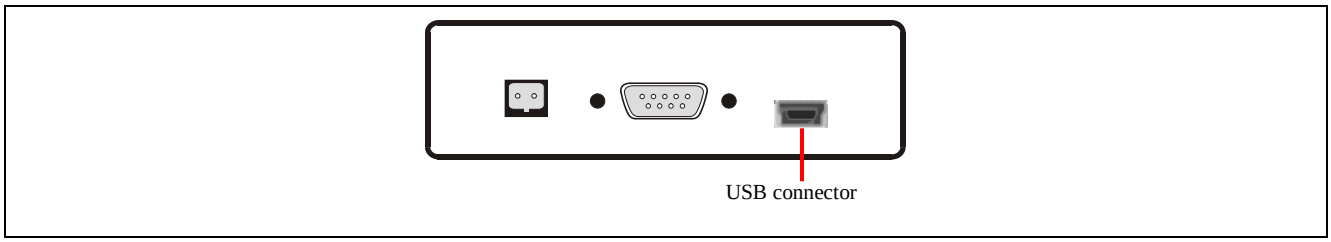


Figure 7.6 USB Connector <FP5 Host Interface Side>

Part number of mini-B USB connector: UX60A-MB-5ST (made by Hirose Electric Co., Ltd.)

7.3.1. USB cable

The USB cable is approximately 2 meters long. The cable is equipped with a USB mini-B type connector and USB type A connector.

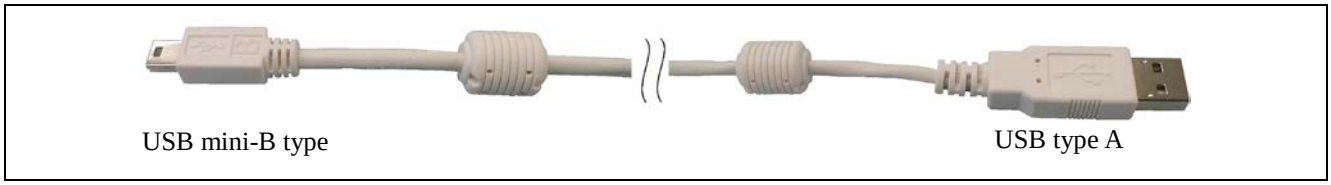


Figure 7.7 USB Cable Outline

7.4. Target Connector

The target connector (15-pin HD-SUB female connector) is laid out on the target connector side of the FP5.

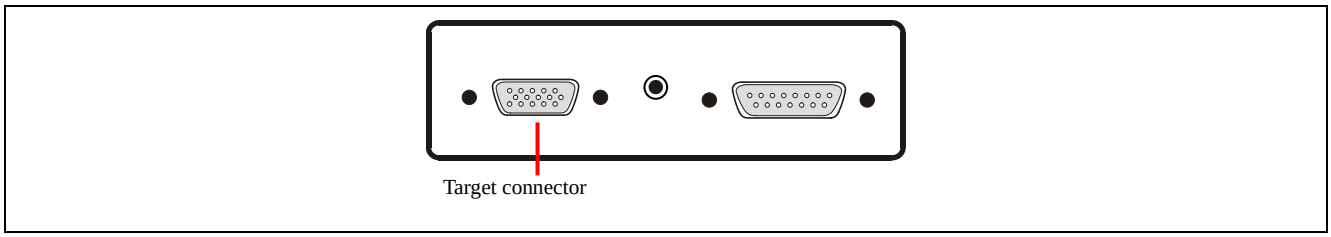


Figure 7.8 Target Connector <FP5 Target Connector Side>

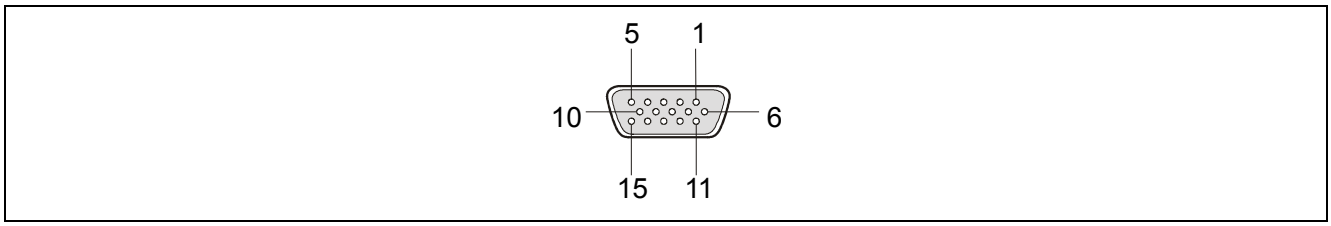


Figure 7.9 Target Connector (15-Pin HD-SUB Female Connector) Pin Assignment

Table 7.2 Target Connector Pin Configuration

Target Connector	Signal Name
1	SO/TxD/IO3/FPDR/FPMD3
2	SI/RxD/FPDT
3	SCK/IO4/FPCK/FPMD4
4	$\overline{\text{RESET}}$
5	V_{DD2}
6	FLMD1
7	H/S
8	V_{DD}
9	V_{DD}
10	RFU-1/IO1/FPMD1
11	V_{PP}
12	FLMD0/IO0/FPMD0
13	VDE/IO2/FPMD2
14	CLK/IO5/FPMD5
15	GND

Note Part number of target connector (15-pin HD-SUB female connector): 070431FB015S200ZU (Suyin Connector Corp.)

7.4.1. Target cable (16-pin type)

The target cable (16-pin type) is a standard shielded cable approximately 42 centimeters long. The target cable is equipped with a 15-pin HD-SUB male connector and a 16-pin 2.54 mm pitch multipurpose female connector.

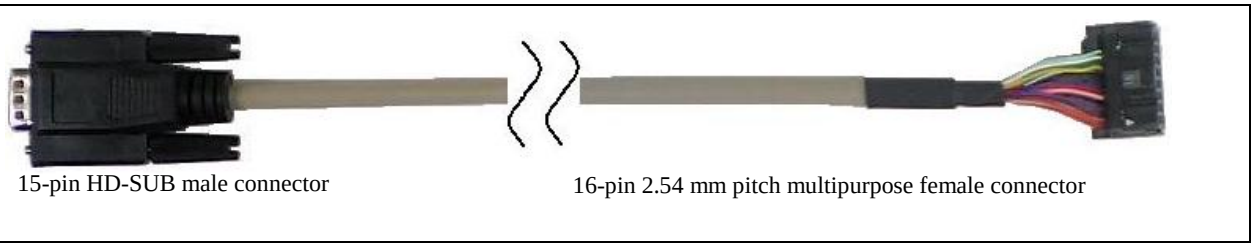


Figure 7.10 Target Cable (16-pin type) Outline

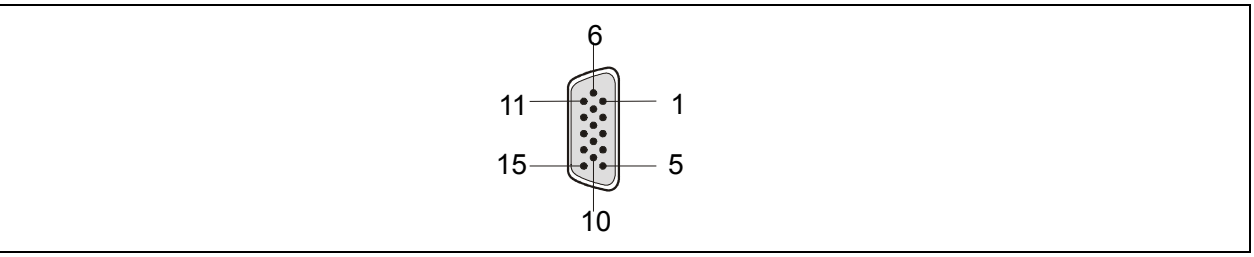


Figure 7.11 15-Pin HD-SUB Male Connector Pin Assignment of Target Cable (16-pin type)

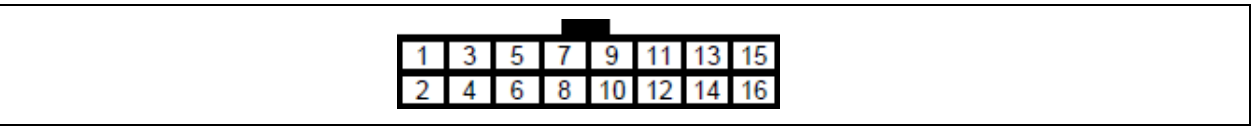


Figure 7.12 16-Pin 2.54 mm Pitch Multipurpose Female Connector Outline of Target Cable (16-pin type) (View from Socket Side)

Table 7.3 Target Connector (16-pin type) Pin Configuration

Signal Name	15-Pin HD-SUB Male Connector	16-Pin 2.54 mm Pitch Multipurpose Female Connector
GND	15	1
$\overline{\text{RESET}}$	4	2
SI/RxD/FPDT	2	3
V_{DD} Note 3	8	4
SO/TxD/IO3/FPDR/FPMD3	1	5
V_{PP}	11	6
SCK/IO4/FPCK/FPMD4	3	7
H/S	7	8
CLK/IO5/FPMD5	14	9
VDE Note 1/IO2/FPMD2	13	10
V_{DD2}	5	11
FLMD1	6	12
RFU-1 Note 1/IO1/FPMD1	10	13
FLMD0/IO0/FPMD0	12	14
Not used Note 2	–	15
Not used Note 2	–	16

Notes 1. Reserved pins. Leave these pins open.
2. Left open in the target cable (16-pin type).
3. No.9 pin of 15-pin HD-SUB connector is not connected to a 16-pin 2.54 mm pitch multipurpose connector.

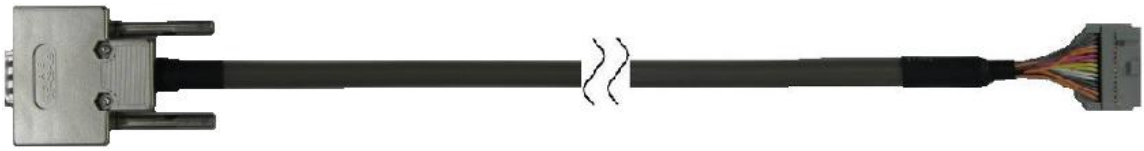
Note The following are the recommended connectors to be connected to 16-pin 2.54 mm pitch multipurpose female connectors.

- HIF3FC-16PA-2.54DS (made by Hirose Electric Co., Ltd., right angle type)
- HIF3FC-16PA-2.54DSA (made by Hirose Electric Co., Ltd., straight type)
- 7616-5002PL (Sumitomo 3M Limited, right angle type)
- 7616-6002PL (Sumitomo 3M Limited, straight type)

When using a self-made cable because the supplied cable cannot be used due to the target system specifications, the cable characteristics should be equivalent or higher than those of the supplied cable.
Note that communication may be performed at high speed depending on the communication settings. Consequently, communication errors may occur and causing abnormal operation.

7.4.2. Target cable (14-pin type)

The target cable (14-pin type) is a standard shielded cable approximately 42 centimeters long. The target cable is equipped with a 15-pin HD-SUB male connector and a 14-pin 2.54 mm pitch multipurpose female connector.



15-pin HD-SUB male connector

14-pin 2.54 mm pitch multipurpose female connector

Figure 7.13 Target Cable (14-pin type) Outline

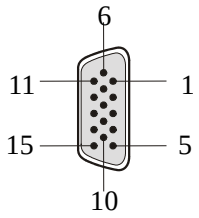


Figure 7.14 15-Pin HD-SUB Male Connector Pin Assignment of Target Cable (14-pin type)

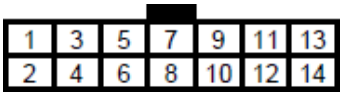


Figure 7.15 14-Pin 2.54 mm Pitch Multipurpose Female Connector Outline of Target Cable (14-pin type) (View from Socket Side)

Table 7.4 Target Connector (14-pin type) Pin Configuration

FP5 Signal Name	15-Pin HD-SUB Male Connector	14-Pin 2.54 mm Pitch Multipurpose Female Connector
SCK/IO4/FPCK/FPMD4	3	1
GND	15	2
CLK/IO5/FPMD5	14	3
FLMD0/IO0/FPMD0	12	4
SI/RxD/FPDT	2	5
RFU-1[Note 1]/IO1/FPMD1	10	6
SO/TxD/IO3/FPDR/FPMD3	1	7
V_{DD}	8	8
FLMD1	6	9
VDE/IO2/FPMD2	13	10
H/S	7	11
GND	15	12
$\overline{\text{RESET}}$	4	13
Not used[Note 2]	–	14

Notes 1. Reserved pins. Leave these pins open.
2. Left open in the target cable.

Note The following are the recommended connectors to be connected to 14-pin 2.54 mm pitch multipurpose female connectors.

- 7614-6002 (Sumitomo 3M Limited, straight type)
- 2514-6002 (3M Limited, straight type)

When using a self-made cable because the target cable cannot be used due to the target system specifications, the cable characteristics should be equivalent or higher than those of the target cable.
Note that communication may be performed at high speed depending on the communication settings. Consequently, communication errors may occur and causing abnormal operation.

7.5. GND Connector

The banana jack GND connector is laid out on the target connector side of the FP5.

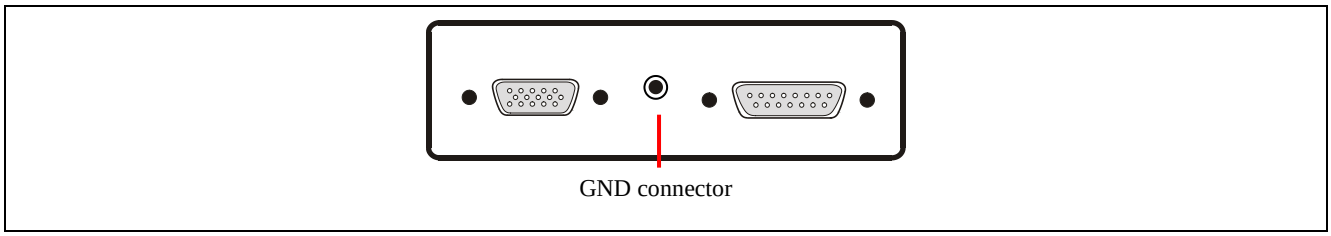


Figure 7.16 GND Connector <FP5 Target Connector Side>

Note Part number of GND connector (banana jack): PB4 (HIRSCHMANN)

7.5.1. GND cable

The host cable is a standard shielded GND cable approximately 1 meter long. The GND cable is equipped with a banana jack and a spade terminal.

Note The FP5 and target system may be damaged if the voltage between the FP5 GND and the target system GND is different. Use the GND cable to match the voltage before connecting the target cable.

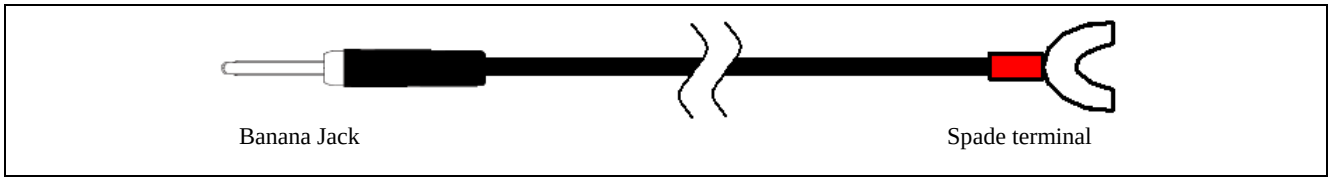


Figure 7.17 GND Cable Outline

Note Part number of banana jack: TJ-2167 (made by Sato Parts Co., Ltd.)
Part number of spade terminal: BPF1.25-3 (red) (Daido Solderless Terminals Mfg. Co., Ltd.)

7.6. Remote Connector

The remote connector (a 15-pin D-SUB female connector) is laid out on the target connector side of the FP5.

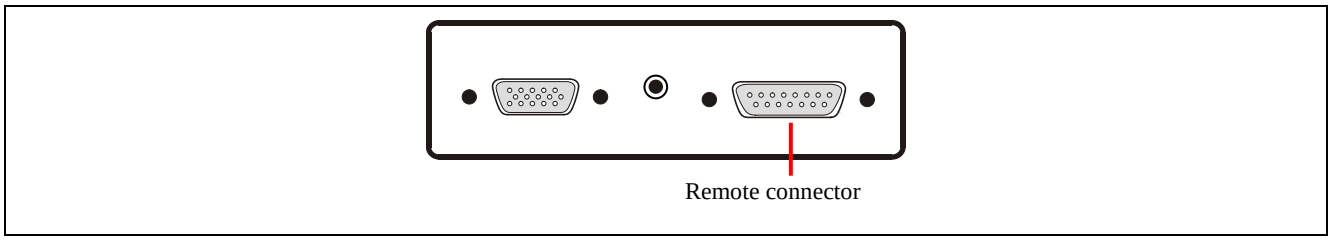


Figure 7.18 GND Connector <FP5 Target Connector Side>

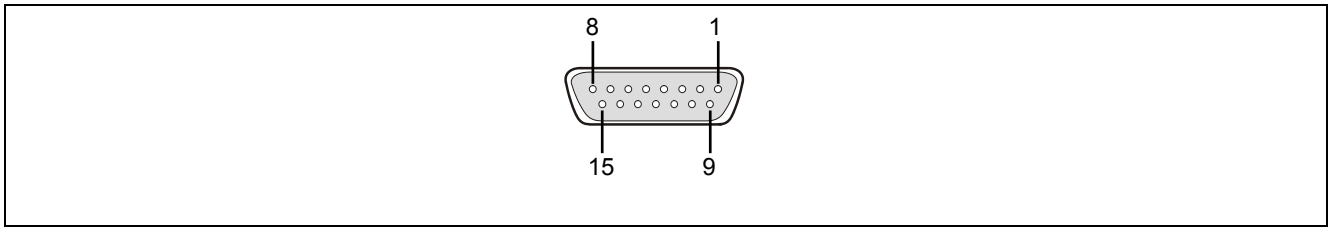


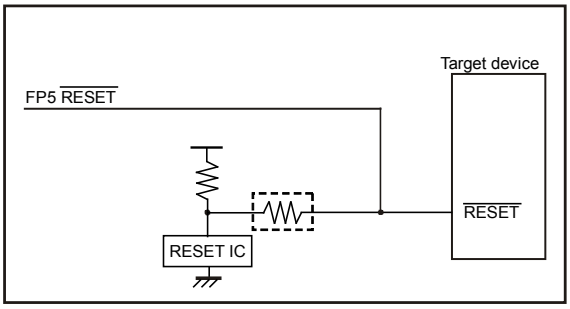
Figure 7.19 Remote connector (15-Pin D-SUB Female Connector) Pin Assignment

Note Part number of remote connector (a 15-pin D-SUB female connector): 07433FB015S200ZU (Suyin Connector)

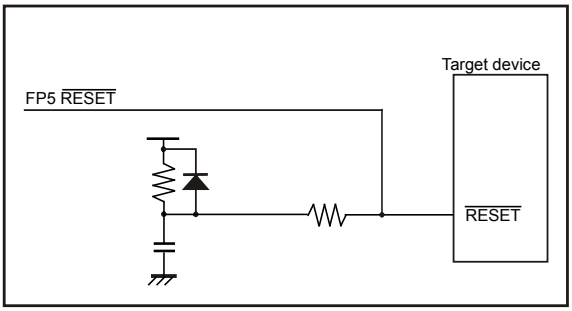
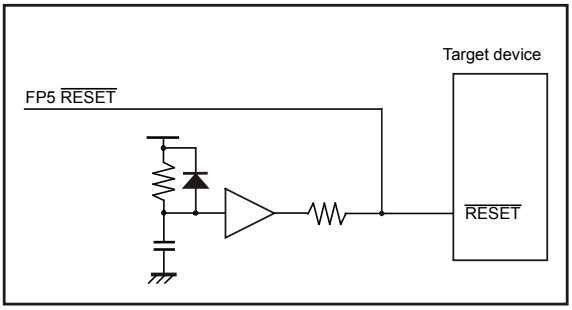
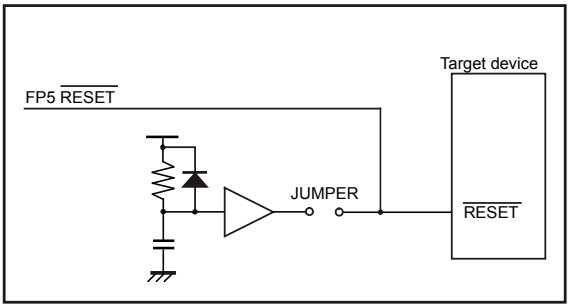
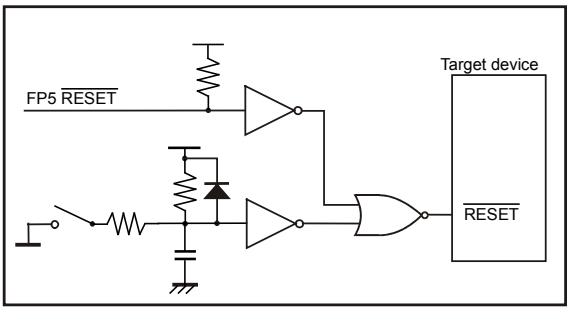
8. NOTES ON TARGET SYSTEM DESIGN

This chapter explains the basic notes on the target system for writing to the flash memory in the target device, using the FP5.

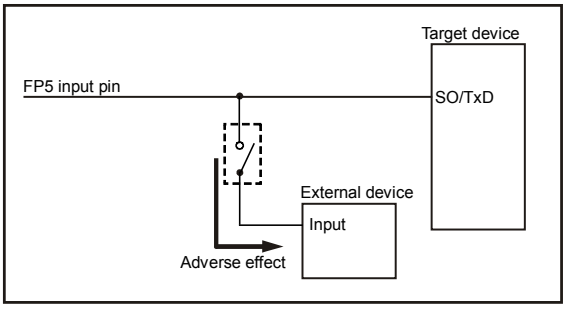
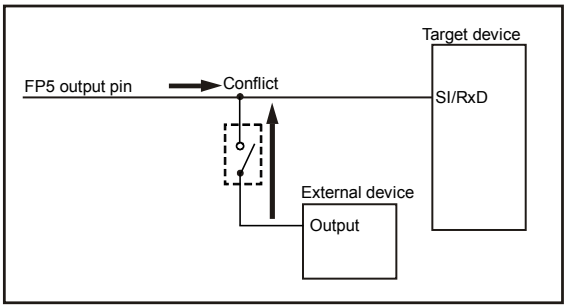
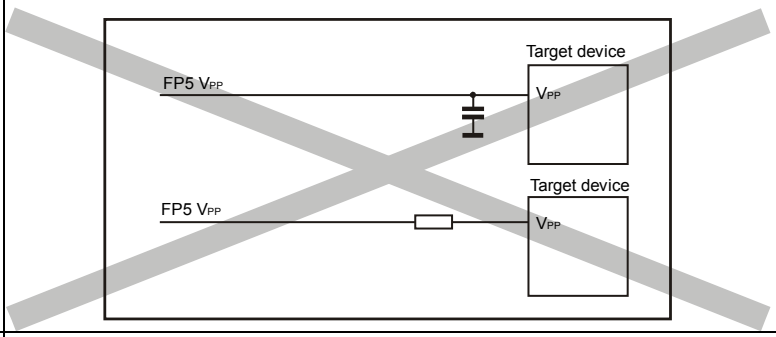
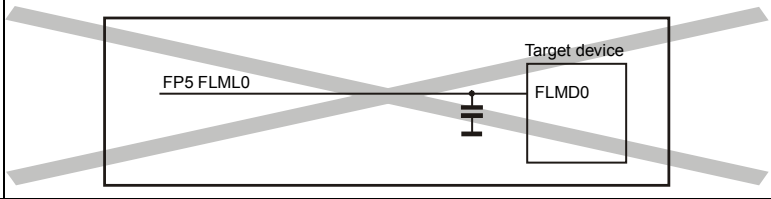
(1)

Target Device Pin	Recommended Design
Common item	•When connecting the FP5 output signal pins, refer to 9 SPECIFICATIONS OF TARGET INTERFACE CIRCUITS and pull up (or pull down) with a resistance in compliance with the device specifications (V_{IH}, V_{IL}). •When connecting the FP5 input signal pins, refer to 9 SPECIFICATIONS OF TARGET INTERFACE CIRCUITS and pull up (or pull down) with a resistance in compliance with the device specifications (I_{OH}, I_{OL}). •After turning on the FP5 power supply, the states of the various terminals before and after command execution will be as follows: -The $\overline{\text{RESET}}$ pin will use Low output. (However, it will be Hi-Z if Hi-Z is set with the FP5 Manager.) -The pins other than the $\overline{\text{RESET}}$ pin and GND pin will be in the Hi-Z state. •Observe the waveforms of the terminals on the target device. If the electrical specifications are not satisfactory, then shape the waveforms by adding buffers, and so on. If using a cable other than the included target cable, be sure to check the waveforms. •Basically, the power supply and clock for the target device should be supplied from the target system. This, however, excludes some target devices which require supply from the FP5. When outputting the clock from the FP5, if the input specs of the target device are not satisfactory, then be sure to shape the waveform. •Be sure to consider contact quality (such as conductivity, durability) of the connector connected to the target cable. We recommend a mechanism that connects to the GND pin. •Unused pins of the target device are set to input mode. Leave them open
$\overline{\text{RESET}}$	When the FP5 $\overline{\text{RESET}}$pin is in the output mode (when the [Enable target RESET] of the [Command options] are not checked), do not connect the $\overline{\text{RESET}}$ signal generating circuit of the target system to the FP5 $\overline{\text{RESET}}$signal, or signal collision would occur. Do not connect the $\overline{\text{RESET}}$signal generator on the target system to the $\overline{\text{RESET}}$ signal of the FP5. Otherwise, a signal conflict will occur. To avoid a conflict, isolate the $\overline{\text{RESET}}$signal generator from the $\overline{\text{RESET}}$signal of the FP5. Do not generate $\overline{\text{RESET}}$while the FP5 is connected. This must be especially noted in a target system in which an external watchdog timer is used.
	Connect the $\overline{\text{RESET}}$signal of the FP5 at a point where the status of the FP5 $\overline{\text{RESET}}$signal and that of the CPU $\overline{\text{RESET}}$pin are the same. **Correct connection <1>:**  RESET IC is an open-drain type circuit. Connect a resistor to the portion above enclosed in the dotted line, as necessary.

(2)

Target Device Pin	Recommended Design
$\overline{\text{RESET}}$	**Correct connection <2>:**  **Correct connection <3>:**  **Correct connection <4>:**  **Correct connection <5>:** 

(3)

Target Device Pin	Recommended Design
I/O pins	When a target device pin used by the FP5 is also connected to the input of an external device, and if that target device malfunctions, disconnect the external device as shown in the portion below enclosed in the dotted line or make it output high impedance like dotted line. Example:  If a target device pin used by the FP5 is also connected to the output of an external device like dotted line, and a signal collision occurs, disconnect the external device as shown in the portion below enclosed in the dotted line. Example: 
V_{PP}	Keep the wiring between the FP5 connector and the target device V_{PP} pin as thick and as short as possible. Insert neither capacitors nor resistors into the V_{PP} line unless otherwise stated. Incorrect circuit: 
FLMD0	Insert neither capacitors nor resistors into the FLMD0 line unless otherwise stated. 
FLMD1	Connect the FP5, or GND using pull-down resistance on board.
Others	For the recommended connection of unused pins, refer to the user's manual of the target device. Some target devices have pins that must be connected differently. For these pins also, refer to the user's manual of the target device. Example of pins connected differently: MODE, CKSEL, REGOUT, REGIN, etc.

The following are examples of interface circuits. Refer to the recommended design for the connection of pins in the target device.

<1> SIO-H/S (3-wire clocked communication port, with handshake)

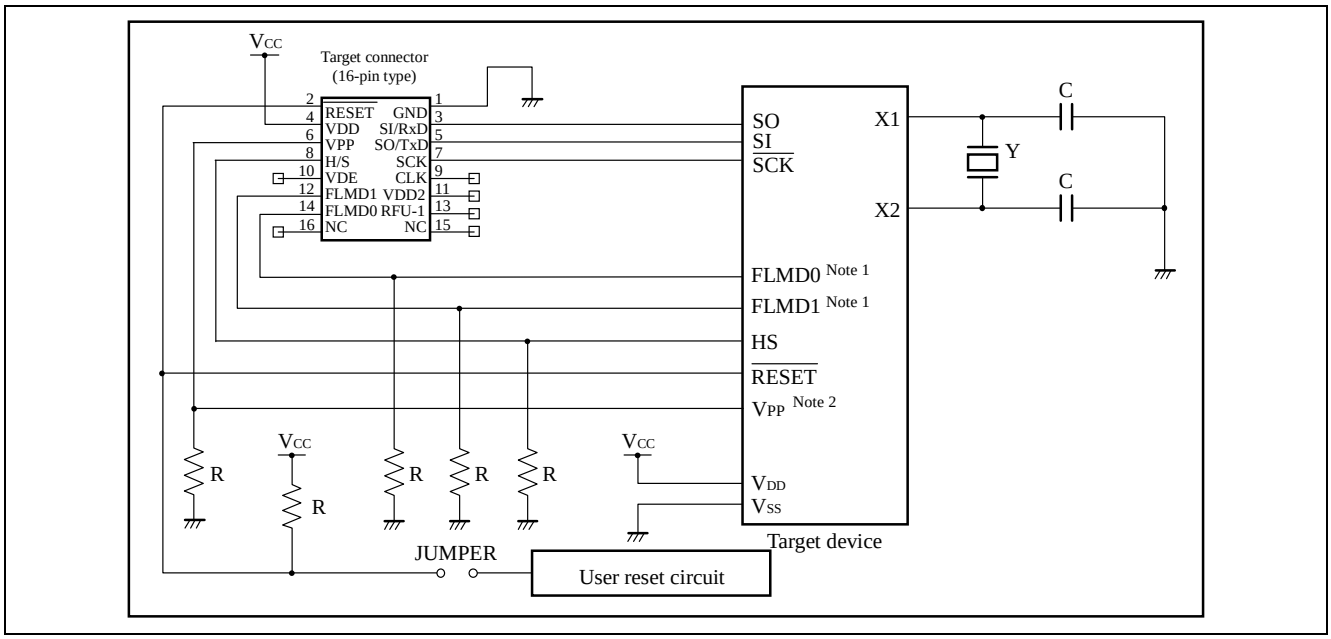


Figure 8.1 SIO-H/S Interface Circuit Example

Notes 1. Pin used in internal single-power-supply flash memory microcontroller
2. Pin used in internal two-power-supply flash memory microcontroller

<2> 78K0S (Single-wire UART)

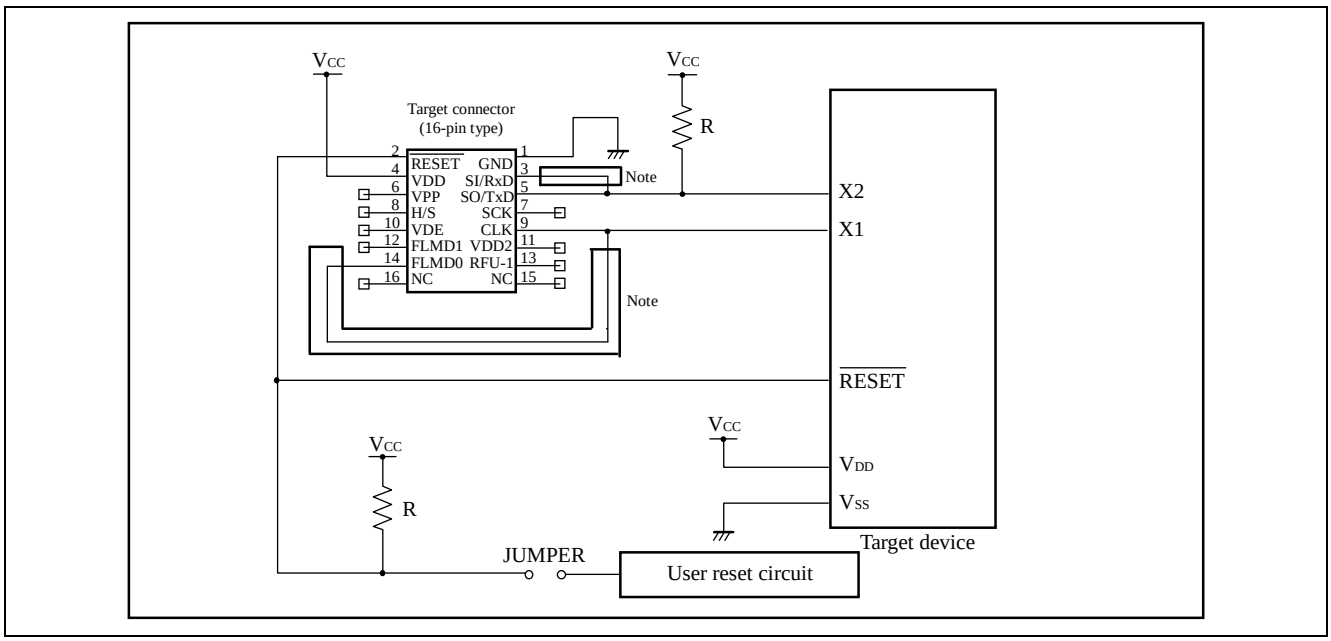


Figure 8.2 Circuit Example for 78K0S (Single-wire UART)

Note These pins do not need to be shorted when using the FP5. Short them if necessary.

<3> 78K0R (Single-wire UART)

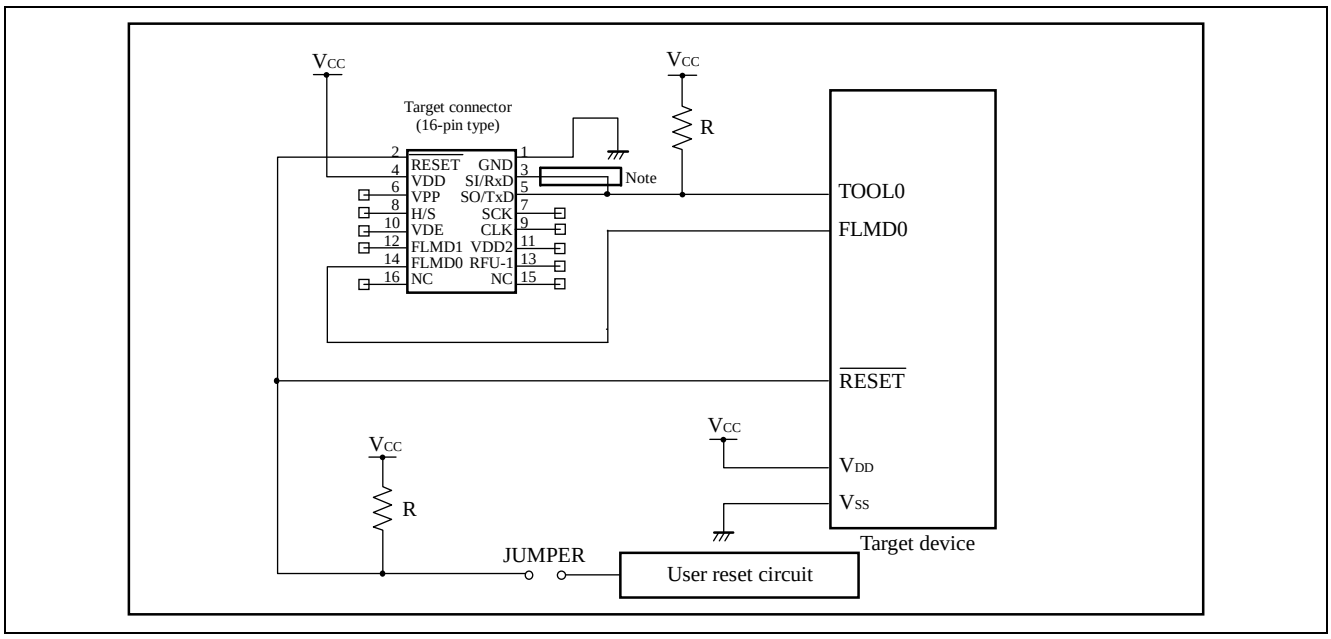


Figure 8.3 Circuit Example for 78K0R (Single-wire UART)

Note These pins do not need to be shorted when using the FP5. Short them if necessary.

<4> I^2C

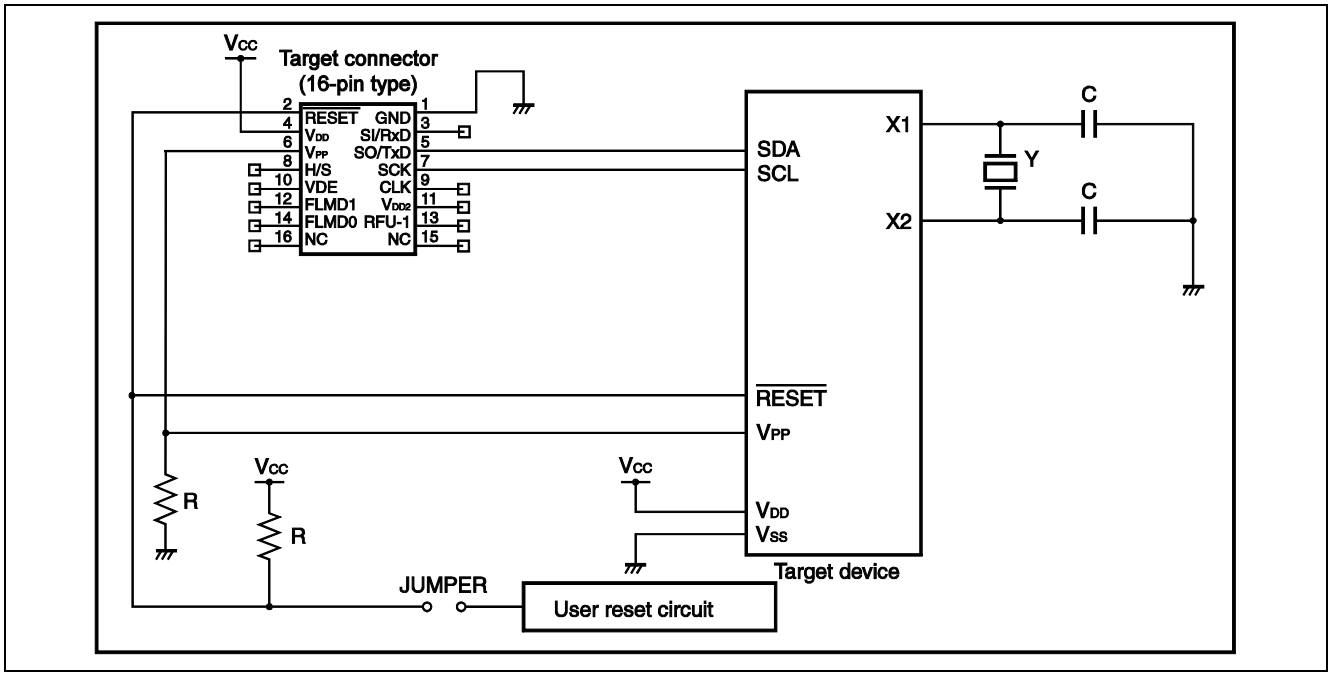


Figure 8.4 Circuit Example for I^2C

<5> 78K0 (TOOLCx, TOOLDx)

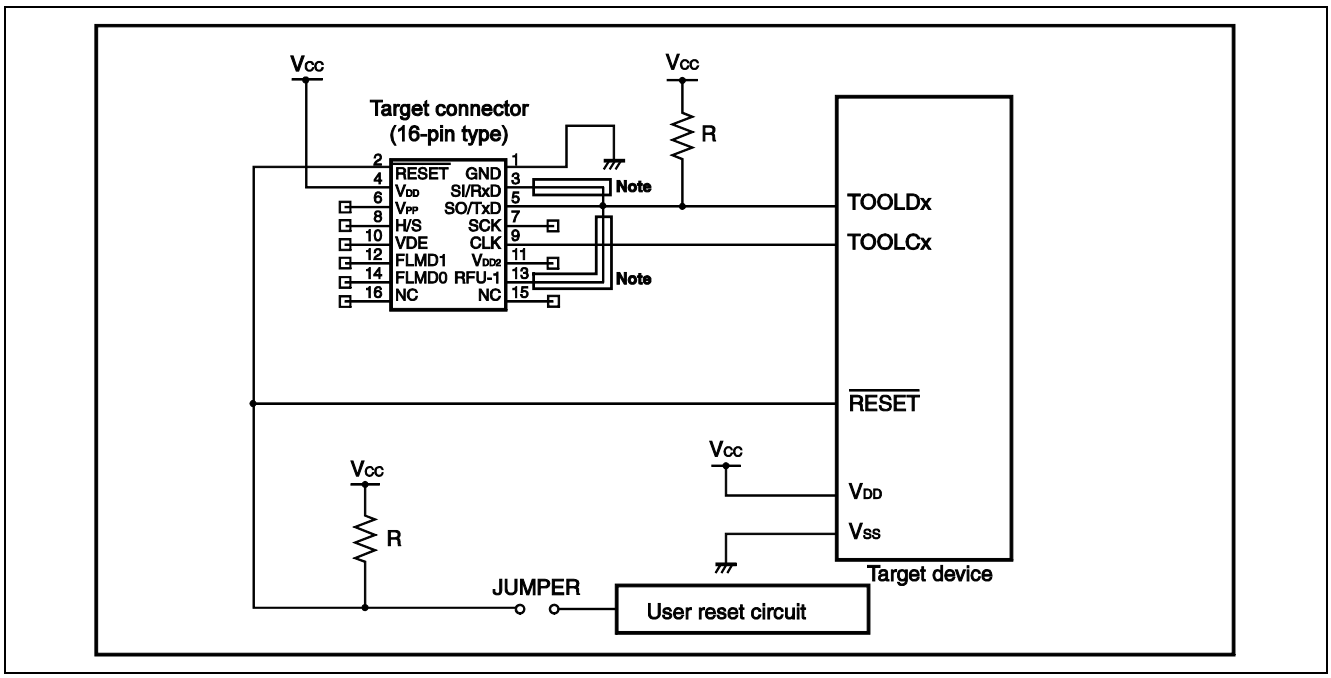


Figure 8.5 Circuit Example for 78K0 (TOOLCx, TOOLDx)

Note These pins do not need to be shorted when using the FP5. Short them if necessary.

<6> V850E2 (Single-wire UART)

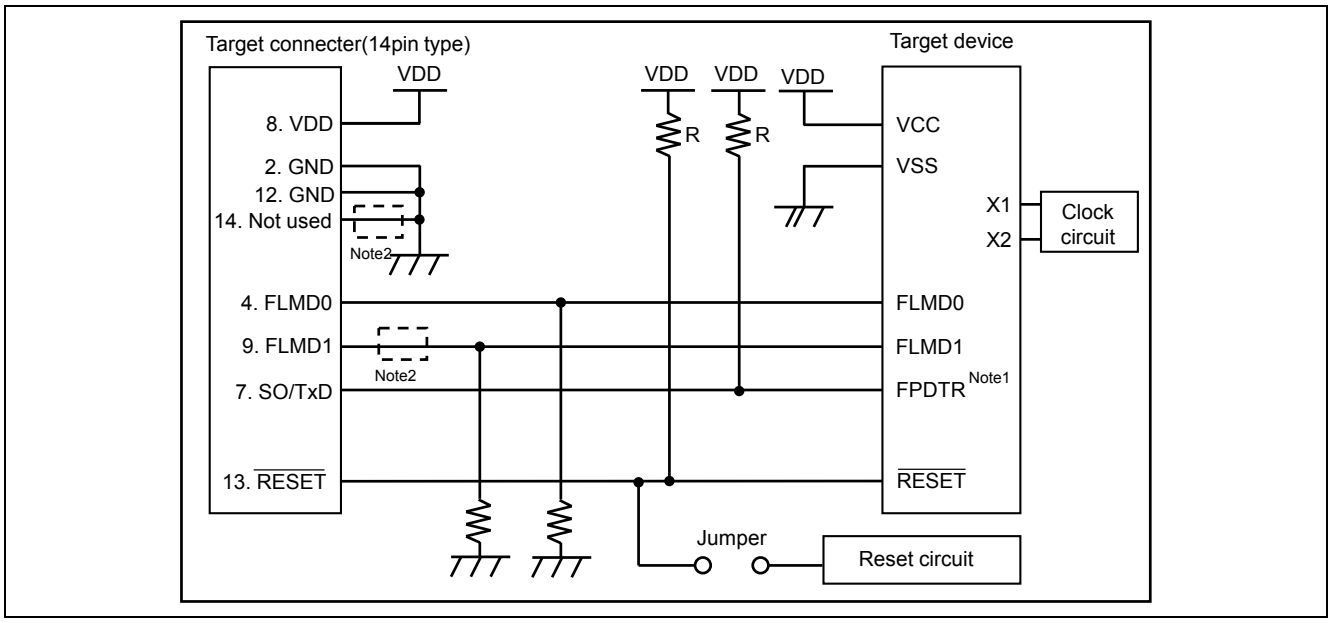


Figure 8.6 Circuit Example for V850E2 (Single-wire UART)

Notes 1. The pin names might differ depending on the target device. For details about the actual pin names, see the user's manual of each target device.

2. These pins do not need to be shorted when using FP5. Short them when using E1 or E20 together.

<7> V850E2 (CSI)

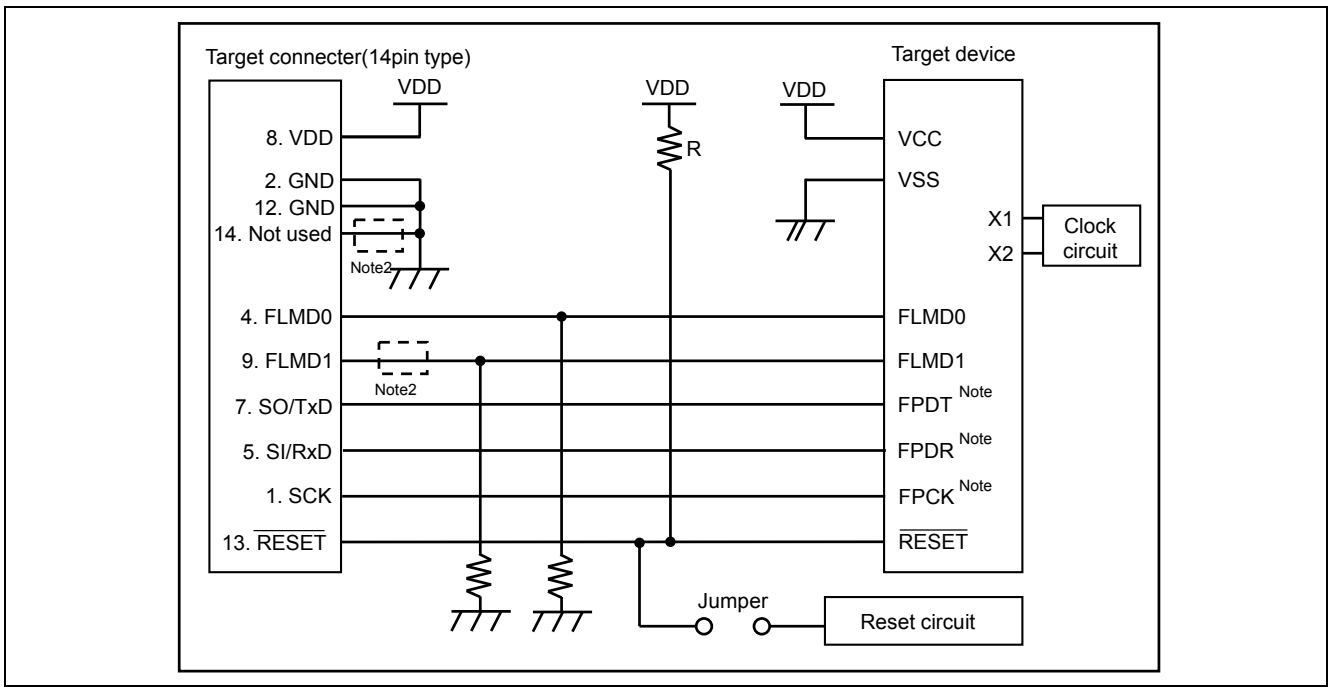


Figure 8.7 Circuit Example for V850E2 (CSI)

Notes 1. The pin names might differ depending on the target device. For details about the actual pin names, see the user's manual of each target device.

2. These pins do not need to be shorted when using FP5. Short them when using E1 or E20 together.

<8> RL78 family (VDD = EVDD)

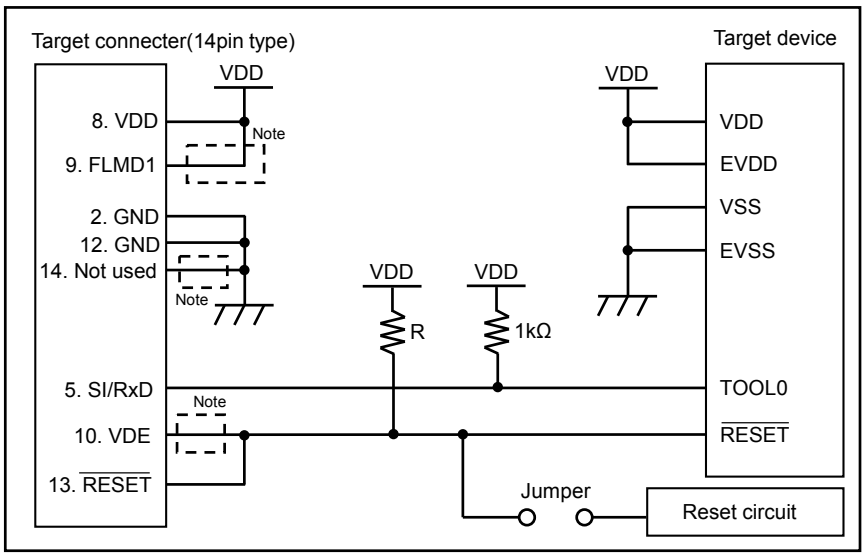


Figure 8.8 Circuit Example for RL78 Family (VDD = EVDD)

Note These pins do not need to be shorted when using FP5. Short them when using E1 or E20 together.

<9> RL78 family (VDD ≠ EVDD)

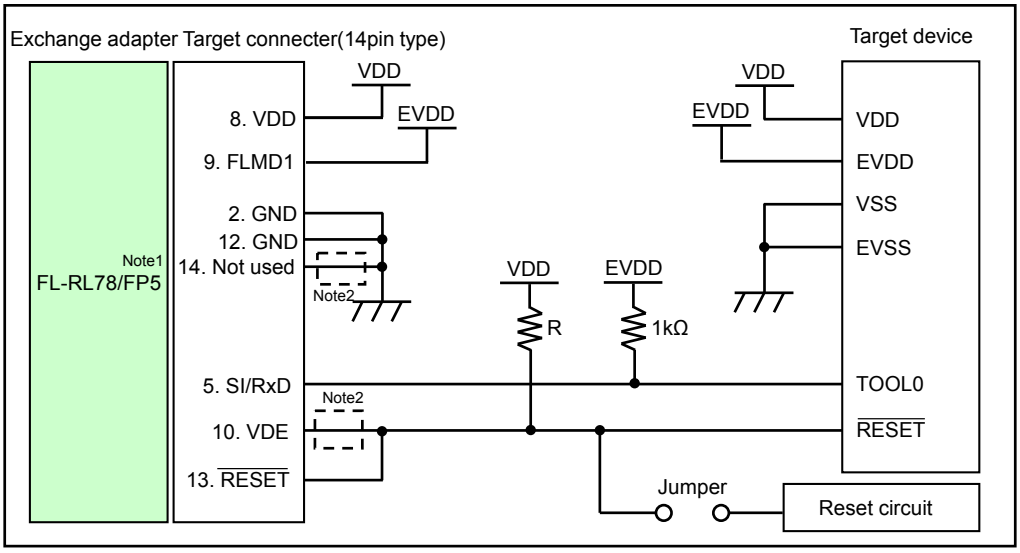


Figure 8.9 Circuit Example for RL78 Family (VDD ≠ EVDD)

Notes 1. To perform write when VDD ≠ EVDD, connect the conversion adaptor FL-RL78/FP5 (a product of Naito Densei Machida Mfg. Co., Ltd.). On the [Advanced] tab in the Device Setup dialog box, enter the voltage value of VDD in the [Vdd[V]] box, enter 0V in the [Vdd2[V]] box, and select the [On Target] check box. For the system configuration and specifications of the FL-RL78/FP5, refer to the FL-RL78/FP5 User's Manual.

2. These pins do not need to be shorted when using FP5. Short them when using E1 or E20 together.

<10> RX family (Except RX64x), SuperH family

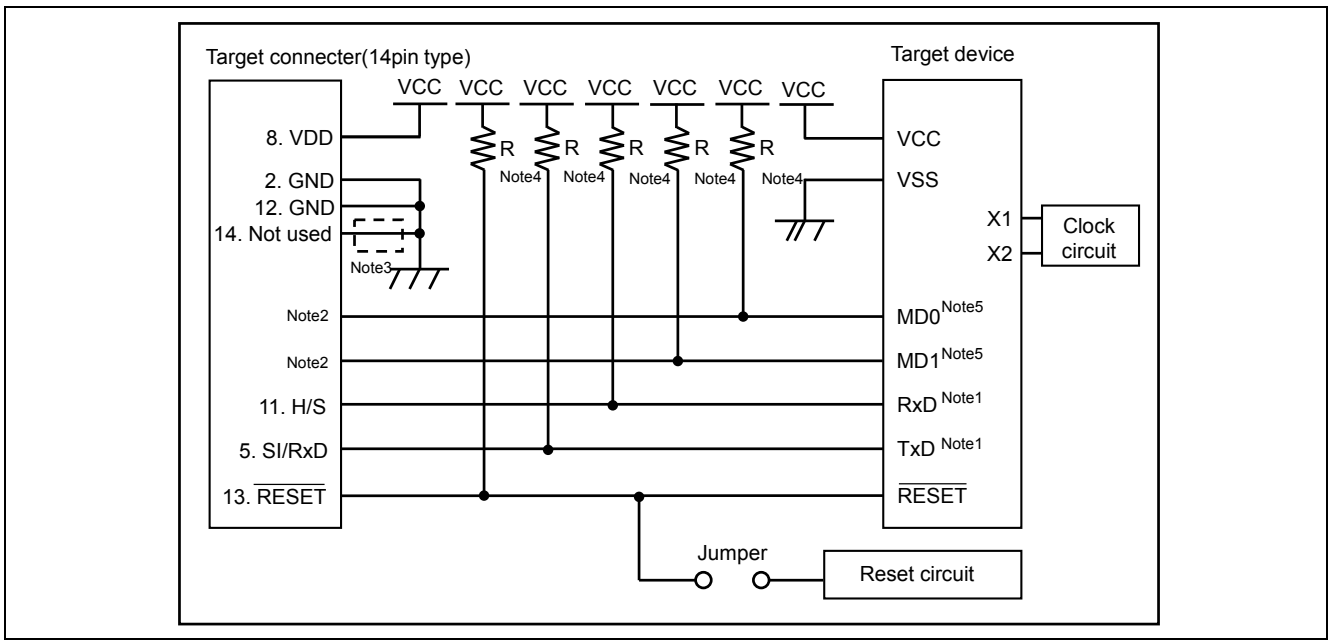


Figure 8.10 Circuit Example for RX Family and SuperH Family (Circuit Example for RX62T)

Notes
1. For the serial communication interface (SCI) that can be used for writing, refer to the user's manual of the target device.
2. Connect the MD0 and MD1 pins (Mode Setting Pin of Operating Mode) to any of the IO0 to IO5 pins. The signal settings for IO0 to IO5 pins can be set in the [I/O Signal Settings] area on the [Advanced] tab in the Device Setup dialog box. For RX62T, set MD0 to High, MD1 to Low, and unused I/O signals to High-Z. Normally, use the initial settings in the [I/O Signal Settings] area. It is compatible with write circuit examples with Flash Development Toolkit.
3. These pins do not need to be shorted when using FP5. Short them when using E1, E20 or E8a together.
4. Set the R value to between 4.7 and 10 kΩ when using E1, E20 or E8a together.
5. The mode setting pins for setting the operating mode may differ with the target device. Refer to the user's manual for the target device you are using.

<11> R8C family

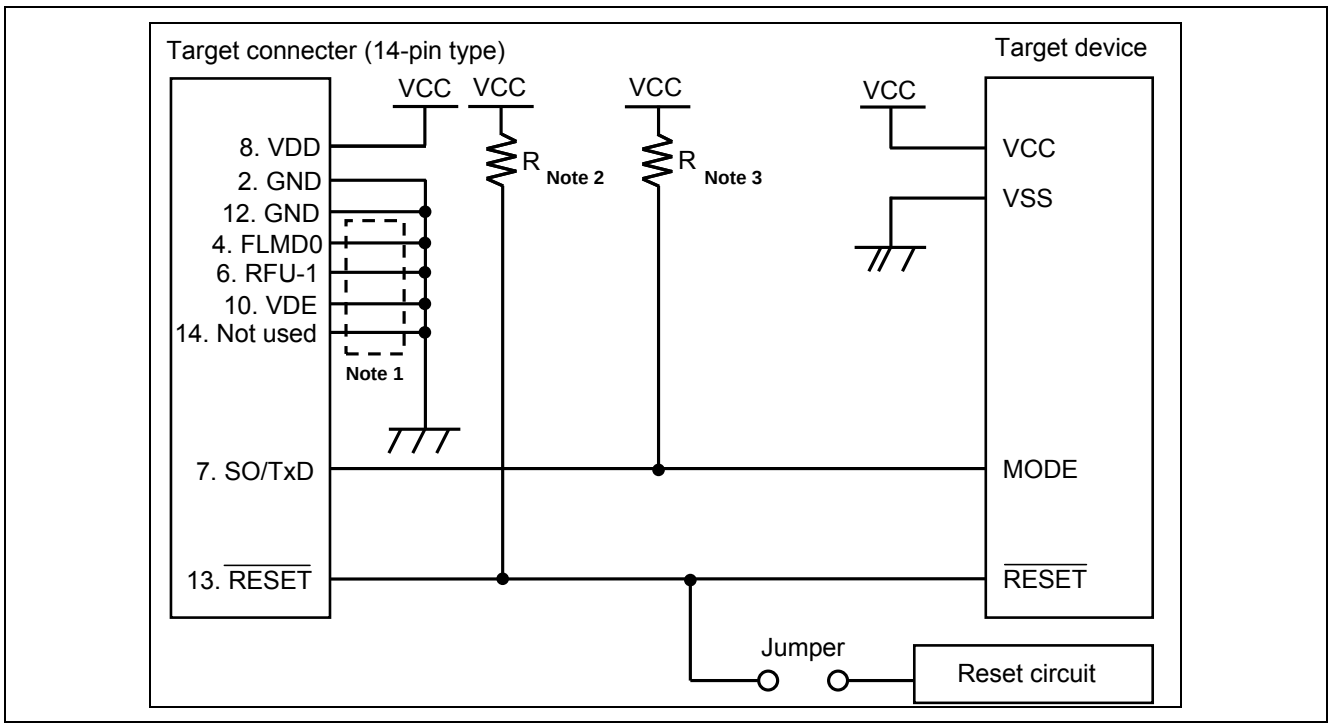


Figure 8.11 Circuit Example for R8C Family

Notes 1. These pins do not need to be shorted when using FP5. Short them when using E1, E20 or E8a together.
2. Set the R value to 4.7 kΩ or higher when using E1, E20 or E8a together.
3. Set the R value to 4.7 kΩ ± 10% when using E1, E20 or E8a together.

<12> RX100, RX200 series (FINE)

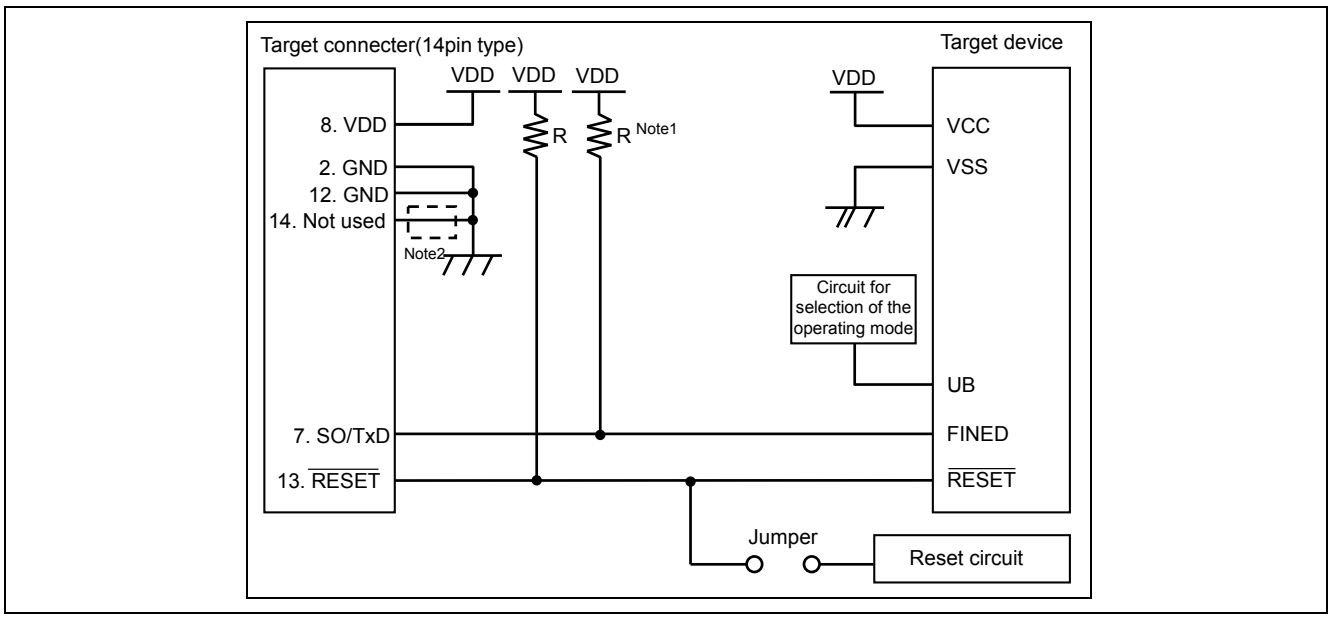


Figure 8.12 Circuit Example for RX100, RX200 series (FINE)

Notes 1. Set the R value of FINED to 4.7 kΩ when using E1 or E20.
2. These pins do not need to be shorted when using FP5. Short them when using E1 or E20 together.

<13> RH850 family (1 wire UART)

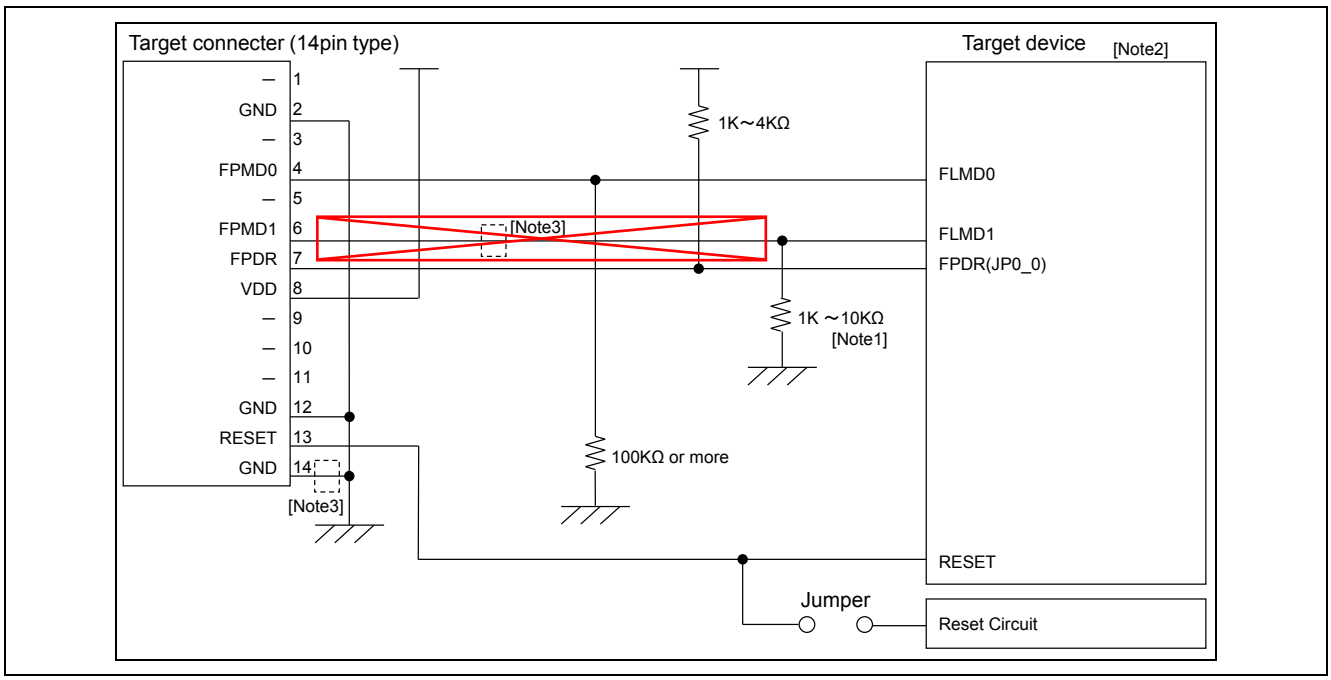


Figure 8.13 Circuit Example for RH850 family (1 wire UART)

Notes 1. This signal must be set at low level when resetting.
2. Pin name differs according to the target device.
3. These pins do not need to be shorted when using FP5. Short them when using E1 or E20 together.

<14> RH850 family (2 wire UART)

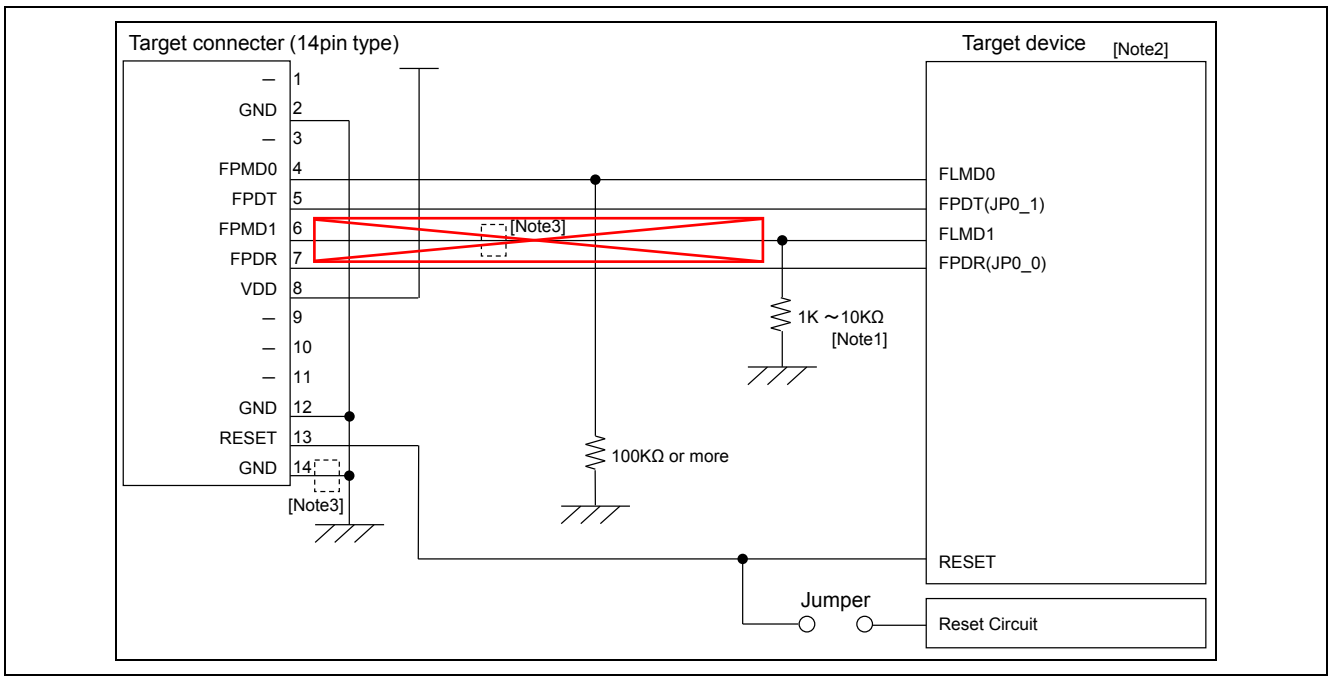


Figure 8.14 Circuit Example for RH850 family (2 wire UART)

Notes 1. This signal must be set at low level when resetting.
2. Pin name differs according to the target device.
3. These pins do not need to be shorted when using FP5. Short them when using E1 or E20 together.

<15> RH850 family (CSI)

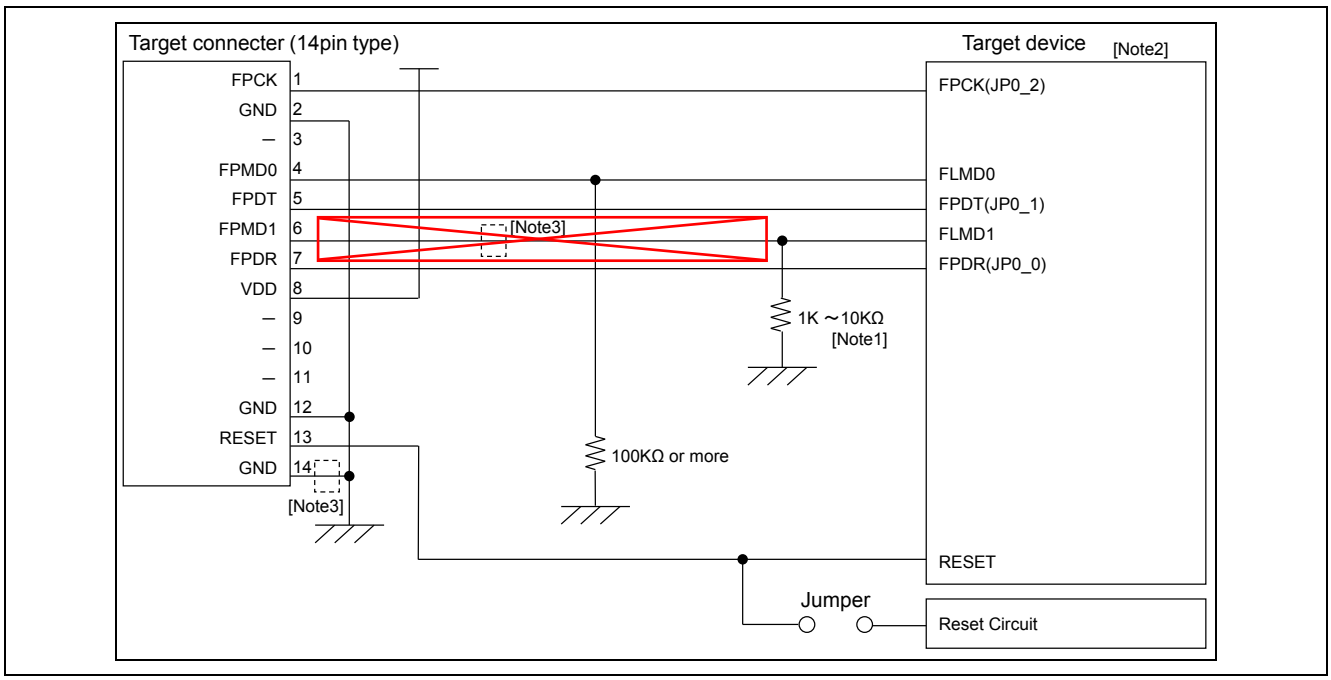


Figure 8.15 Circuit Example for RH850 family (CSI)

Notes 1. This signal must be set at low level when resetting.
2. Pin name differs according to the target device.
3. These pins do not need to be shorted when using FP5. Short them when using E1 or E20 together.

9. SPECIFICATIONS OF TARGET INTERFACE CIRCUITS

This chapter describes the target interface specifications (signals connected to the FP5 and the target system), by using equivalent circuits.
Note: The internal voltage regulator generates the FP5_VDD and FP5_VDD2 voltages.

9.1. SO/TxD/IO3/FPDR/FPMD3, RESET and SCK/IO4/FPCK/FPMD4

SO/TxD/IO3/FPDR/FPMD3, SCK/IO4/FPCK/FPMD4 signal lines output C-MOS level signals. When a 78K0R, 78K0S/Kx1+, UPD78F9334, V850 (Single-wire UART), RH850 (1 wire UART), or R8C is used, the SO/TxD/IO3/FPDR/FPMD3 signal line functions as an open-drain output. When the RESET signal line is at the high level, the output is momentarily at the CMOS level. The pin is otherwise an open drain output.

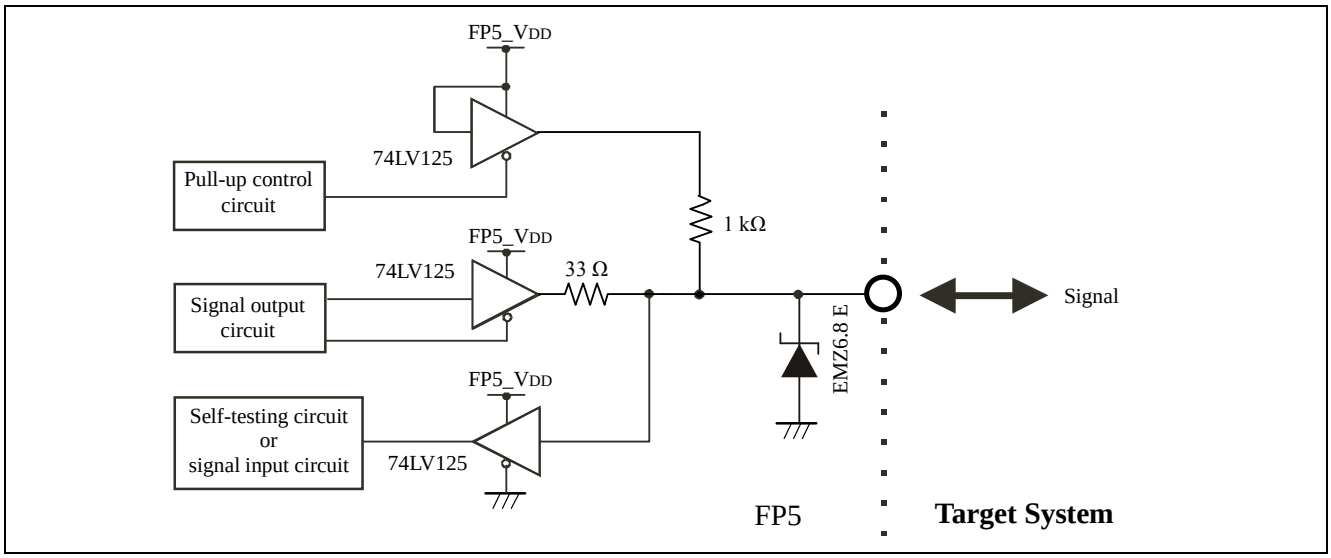


Figure 9.1 SO/TxD/IO3/FPDR/FPMD3, $\overline{\text{RESET}}$and SCK/IO4/FPCK/FPMD4 Pins

9.2. SI/RxD/FPDT and H/S

The SI/RxD/FPDT and H/S input signal voltages must not exceed the rated maximum voltage. However, for the RL78, the SI/RxD/FPDT pin becomes an I/O pin, and it is open-drain output upon output. For the RX family and SuperH family, the H/S signal line is C-MOS level output.

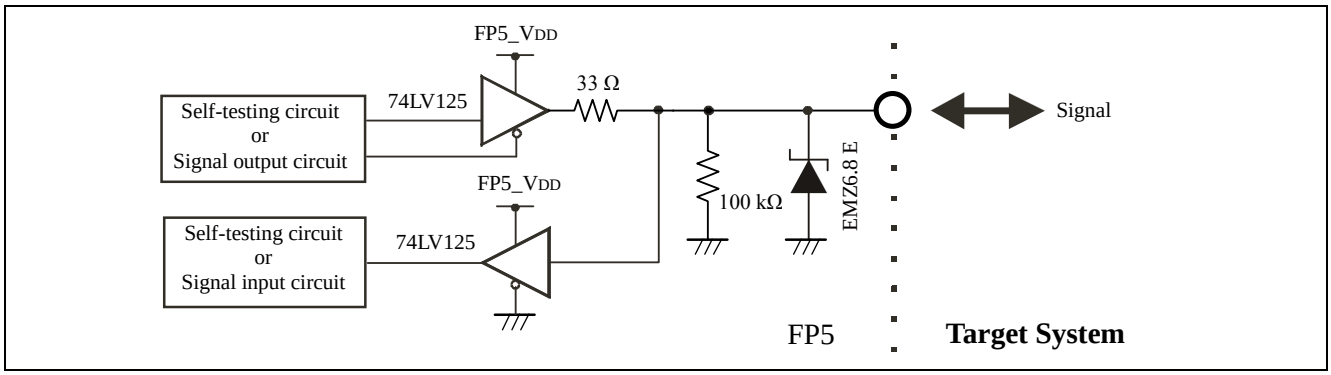


Figure 9.2 SI/RxD/FPDT and H/S Pins

9.3. CLK/IO5/FPMD5

It is recommended to supply the target device operating clock from the target system. When supplying the target device operating clock from the FP5, communication may not be performed normally due to the waveform distortion caused by wiring of clock lines on the target system. In such a case, add elements such as CMOS buffers to the target system as necessary so as to adjust the waveform.

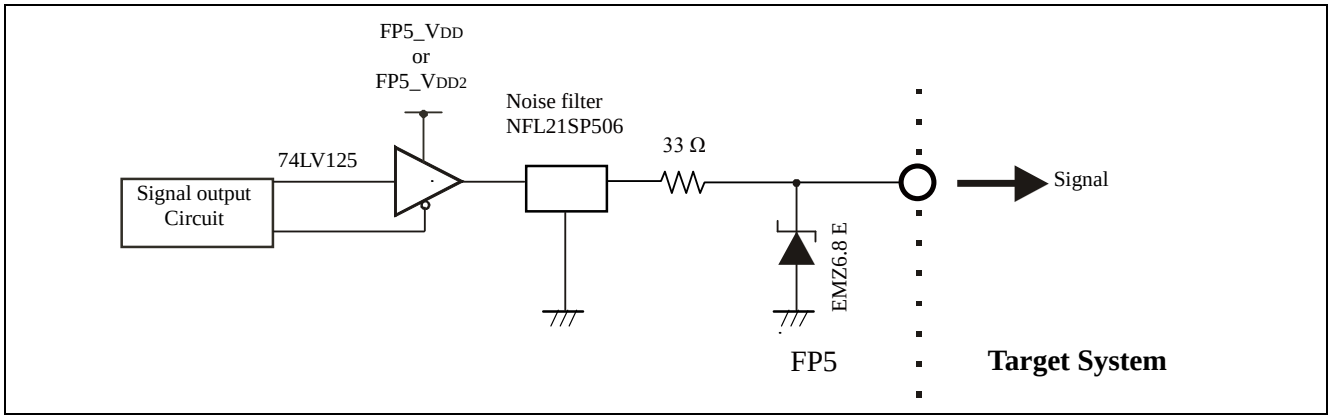


Figure 9.3 CLK/IO5/FPMD5 Pins

9.4. FLMD0/IO0/FPMD0, FLMD1, RFU-1/IO1/FPMD1, and VDE/IO2/FPMD2

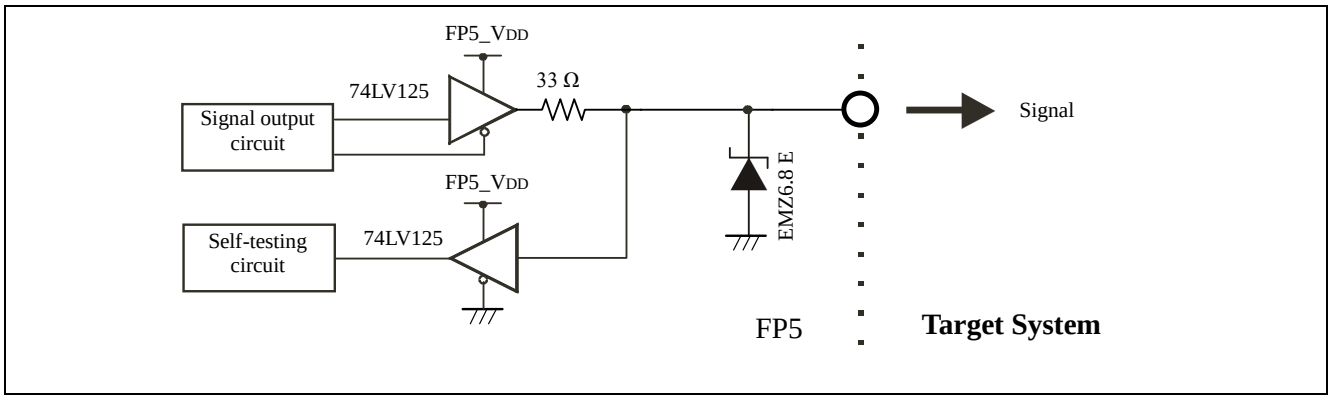


Figure 9.4 FLMD0/IO0/FPMD0, FLMD1, RFU-1/IO1/FPMD1, and VDE/IO2/FPMD2 Pins

9.5. V_{DD} and V_{DD2}

When supplying V_{DD} and V_{DD2} from the target system, the FP5 internal power supply and the external voltage regulator is protected by a transistor.

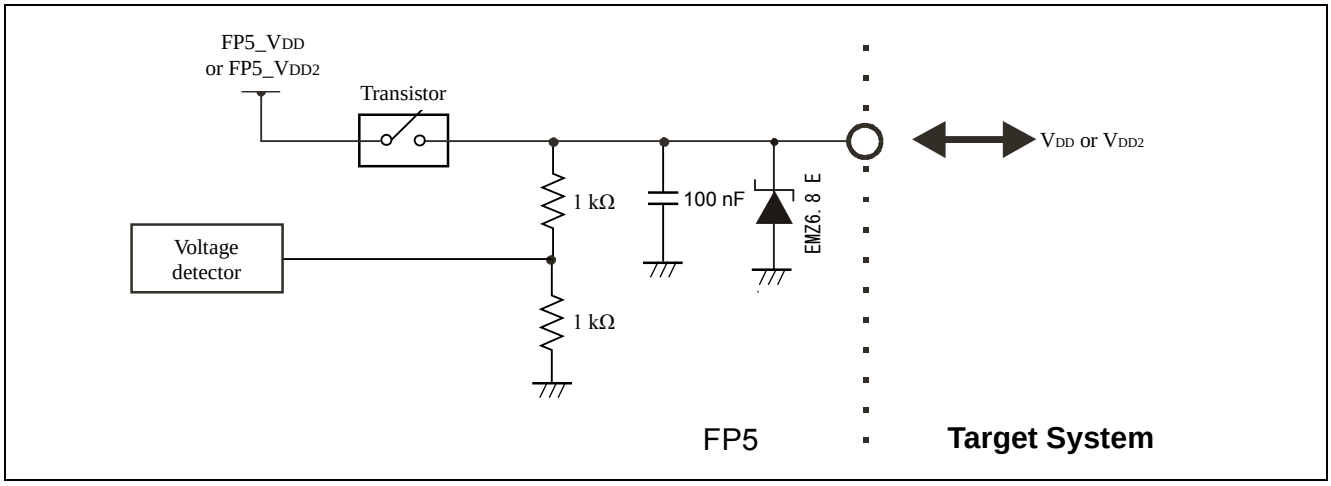


Figure 9.5 V_{DD} and V_{DD2} Pins

9.6. V_{PP}

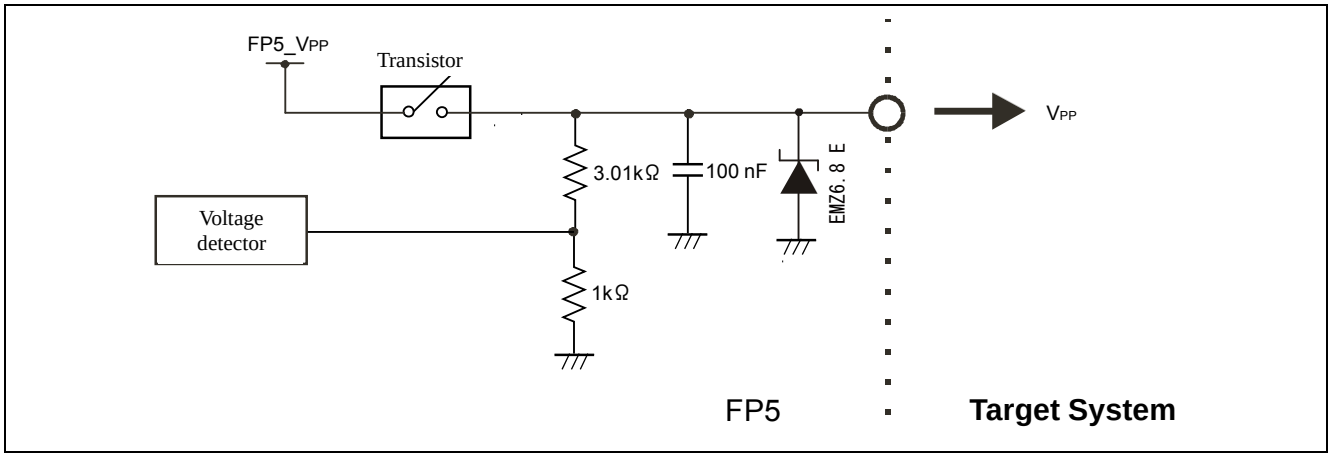


Figure 9.6 V_{PP} Pin

10. TROUBLESHOOTING

This chapter explains troubleshooting.

Note Using the self-testing function, the user can find out the reason why the FP5 does not operate normally, such as a defect in the FP5, or problems in other hardware. For how to use the tool, refer to each microcontroller edition 1.3.2 (6) [Self-Test] command.

10.1. Problems During Startup

This section explains troubleshooting for problems that may occur between software installation and startup.

(1) The POWER button on FP5 is pressed but the LED does not turn on.
[Cause]
The cause may be a poor connection of the FP5 or AC adaptor, or a possible defect.
[Action]
Confirm that the AC adaptor is plugged in firmly. If this does not resolve the problem, consider repair.

(2) When the USB cable is connected and power to the FP5 is turned on, the driver is not recognized by Plug and Play.
[Cause]
The USB connector may not be inserted properly into the USB port.
[Action]
Confirm that the USB connectors are fully inserted into the USB ports of the host PC and the FP5.
Alternatively, disconnect the USB connector and insert it again after a short time.

(3) The USB driver file cannot be found at a specified location.
[Cause]
The USB driver may not have been installed correctly.
[Action]
Refer to 3 SOFTWARE INSTALLATION and reinstall the USB driver.

(4) The “Add New Hardware Wizard” screen appears when FP5 is connected with the host PC via a USB port.
[Cause]
If the USB connector is not inserted into the USB port used during USB driver installation but into another USB port, the FP5 may be recognized as a new hardware item.
[Action]
Refer to 3 SOFTWARE INSTALLATION and install the USB driver again.

10.2. Problems During Operation

This section explains troubleshooting for problems that may occur during operation.

Note For causes and actions for the messages displayed in the error dialog box, information dialog box or action log window, refer to APPENDIX A MESSAGES.

(1) Error Message “E 1100 communication within host PC and Flash Programmer is broken” is displayed in the action log window.
[Cause 1]
The USB cable or serial cable may not be connected properly, the USB driver may not have been installed correctly, or power to the FP5 has been turned off.
[Action 1]
Refer to 10.1 Problems During Startup and take appropriate action.

[Cause 2]
When “Renesas USB Development Tools” is expanded in the Device Manager while the FP5 is connected via a USB port, “Flash Programmer FP5” is not displayed. Alternatively, a “!” or “×” is attached.
[Action 2]
<1> Turn on power to the FP5 while it is connected to the host PC via a USB port, right-click the driver marked with the “!” or “×”, and then click [Delete (E)] on the shortcut menu.
<2> Execute [Scan for hardware changes] in the Device Manager.
<3> Reinstall the USB driver with Plug and Play.

[Cause 3]
The FP5 may not have been recognized (when connected via USB hub).
[Action 3]
Try the following.
<1> Disconnect the USB cable and then reconnect it.
<2> Connect the USB connector to another port on the USB hub.
<3> If the above measures do not resolve the problem, do not use the USB hub but directly connect the USB connector to the USB port of the host PC.

(2) The following messages are displayed in the action log window and the flash memory programming mode cannot be entered.
ERROR(E012):Connection or synchronization failed
ERROR(E014):Connection or synchronization failed

[Cause 1]
The connection between the target system and FP5 may be incorrect.
[Action 1]
<1> For the 78K or V850, connect the SO/TxD and SI/RxD signals from the FP5 with TxD (SO) and RxD (SI) of the target device so that signal input/output are consistent.

<2> The target interface must be isolated from other devices, using jumper switches or the like; otherwise, malfunction may occur. Refer to 8 NOTES ON TARGET SYSTEM DESIGN, 9 SPECIFICATIONS OF TARGET INTERFACE CIRCUITS or the user's manual of the target device. Moreover, monitor the actual waveform to confirm that the signal is not distorted and the signal level is correct.

[Cause 2]
Connection of pins for other than for the target interface may be incorrect.
[Action 2]
Refer to 8 NOTES ON TARGET SYSTEM DESIGN or the user's manual of the target device.

[Cause 3]
The PR5 file selected in the [Parameter and Setting file] area on the [Target] tab in the Device Setup dialog box may not be correct.
[Action 3]
Use the PR5 file that supports the target device.
For details on PR5 files, refer to 1.3 Supported Devices and each microcontroller edition 1.3.3 (15) (a) <3> [Parameter and Setting file] area.

[Cause 4]
The clock may not be able to be supplied to the target device.
[Action 4]
<1> Check the settings in the [Supply oscillator] area on the [Standard] tab in the Device Setup dialog box. For the correct settings, refer to the supplementary materials for the PR5 file or the user's manual of the target device.
<2> Check the clock supply on the target system by means such as waveform monitoring.

[Cause 5]
Power may not be supplied correctly to the target device.
[Action 5]
<1> Check the settings in the [Supply voltage] area on the [Advanced] tab in the Device Setup dialog box.
<2> Check that power is supplied from the target system. If power is supplied from the FP5, a power shortage may occur because its maximum power supply is 200 mA. In such a case, supply power from the target system and then change the setting.

[Cause 6]
UART communication may not be synchronized.
[Action 6]
When UART is used, communication may not be synchronized due to a baud rate error of the target device. In this case, change the CPU clock or baud rate, or change the communication channel to another communication mode.

[Cause 7]
If using a 78K0S/Kx1+ microcontroller or the UPD78F9334, it is possible that the wrong connection procedure was implemented.
[Action 7]
With devices that using program files in which “use the $\overline{\text{RESET}}$ pin as the input-only port (P34)” is set by the option byte, flash memory programming mode cannot be entered if power is supplied to the target system before the target cable is connected to the target system. Connect the target cable to the target system and then supply power to the target system as prescribed in the connection procedure.

[Cause 8]
For the RX family and Super H family, the I/O signal setting does not match the wiring of the target system.
[Action 8]
Check if the settings in the [I/O Signal Settings] area on the [Advanced] tab in the Device Setup dialog box match the wiring of the target system.

(3) The following message is displayed in the action log window and normal communication is not performed in flash memory programming mode.
ERROR Communication failure or timeout.

[Cause 1]
The clock or power supply may not be stable.
[Action 1]
Confirm that the clock or power is supplied on the target system.

[Cause 2]
Communication may not be stable.
[Action 2]
<1> Confirm that no noise is applied to communication.
<2> Confirm that the FP5 and target system are properly connected.
<3> Confirm that unused pins are properly handled.
<4> Confirm that an appropriate clock and communication rate are selected. Stable programming may be achieved by setting a lower value for the clock or communication rate.

11. MAINTENANCE AND WARRANTY

This chapter covers basic maintenance, warranty information, provisions for repair and the procedures for requesting a repair.

11.1. User Registration

When you purchase our product, be sure to register as a user. For user registration, refer to “User Registration” of this user's manual.

11.2. Maintenance

(1) If dust or dirt collects on this product, wipe it off with a dry soft cloth. Do not use thinner or other solvents because these chemicals can cause the surface coating to separate.
(2) When you do not use this product for a long period, disconnect it from the power supply, host PC and user system.

11.3. Warranty

(1) This product comes with a one-year warranty after purchase.
Should the product break down or be damaged while you’re using it under normal condition based on its user’s manual, it will be repaired or replaced free of cost.

(2) However, if the following failure or damage occurs to the product under warranty, the product will be repaired or replaced at cost.

a) Failure or damage attributable to the misuse or abuse of the product or its use under other abnormal conditions.
b) Failure or damage attributable to improper handling of the product after purchase, such as dropping of the product when it is transported or moved.
c) Failure or damage to the product caused by other pieces of equipment connected to it.
d) Failure or damage attributable to fire, earthquakes, thunderbolts, floods, or other natural disasters or abnormal voltages, etc.
e) Failure or damage attributable to modifications, repairs, adjustments, or other acts made to the product by other than Renesas Electronics Corporation.

(3) Consumables (e.g., sockets and adapters) are not covered by the aforementioned repair.

In the above cases, contact your local distributor. If your product is being leased, consult the leasing company or the owner.

11.4. Repair Provisions

(1) Repairs not covered by warranty
Problems arising in products for which more than one year has elapsed since purchase are not covered by warranty.

(2) Replacement not covered by warranty
If your product's fault falls into any of the following categories, the fault will be corrected by replacing the entire product instead of repairing it, or you will be advised to purchase a new product, depending on the severity of the fault.
- Faulty or broken mechanical portions
- Flaws, separation, or rust in coated or plated portions
- Flaws or cracks in plastic portions
- Faults or breakage caused by improper use or unauthorized repair or modification
- Heavily damaged electric circuits due to overvoltage, overcurrent or shorting of power supply
- Cracks in the printed circuit board or burnt-down patterns
- A wide range of faults that make replacement less expensive than repair
- Faults that are not locatable or identifiable

(3) Expiration of the repair period

When a period of one year has elapsed after production of a given model ceased, repairing products of that model may become impossible.

(4) Carriage fees for sending your product to be repaired
Carriage fees for sending your product to us for repair are at your own expense.

11.5. How to Make Request for Repair

If your product is found faulty, fill in a Repair Request Sheet downloadable from the following URL. And email the sheet and send the product to your local distributor.

http://www.renesas.com/repair

⚠CAUTION

Note on Transporting the Product:

When sending your product for repair, use the packing box and cushioning material supplied with the product when it was delivered to you and specify caution in handling (handling as precision equipment). If packing of your product is not complete, it may be damaged during transportation. When you pack your product in a bag, make sure to use the conductive plastic bag supplied with the product (usually a blue bag). If you use a different bag, it may lead to further trouble with your product due to static electricity.

APPENDIX A MESSAGES

This chapter explains the messages.

A.1. Message Format

Messages will be output in the error/warning dialog boxes, information dialog boxes, or action log window during programming GUI operation. Error messages will be displayed on the FP5 message display during standalone operation.

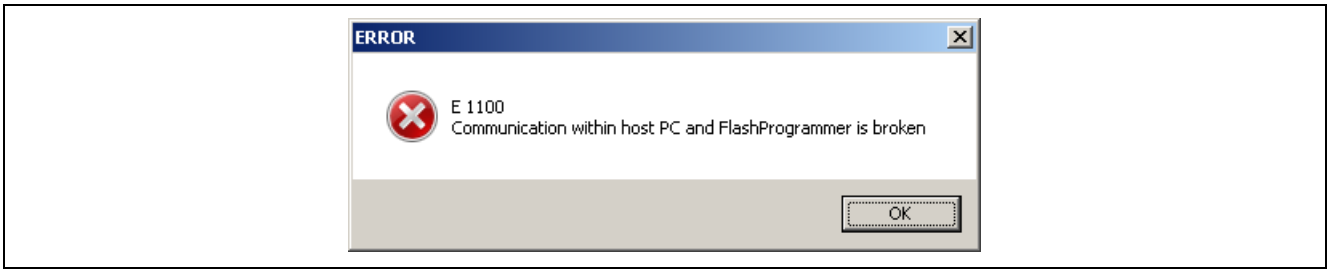


Figure A.1 Error/Warning Dialog Box

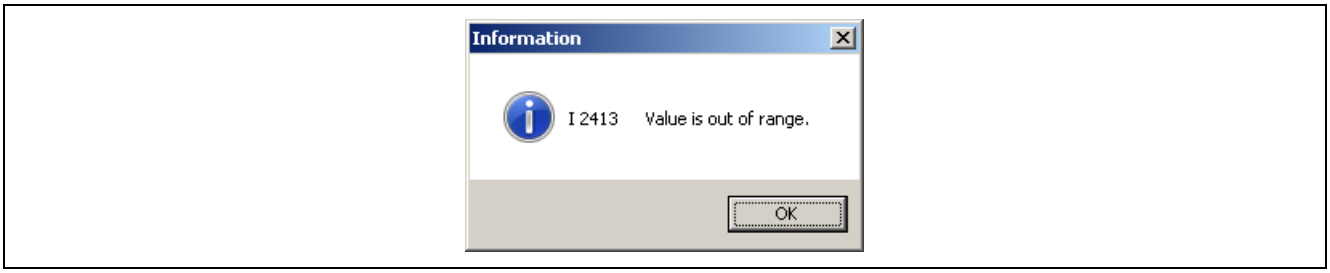


Figure A.2 Information Dialog Box

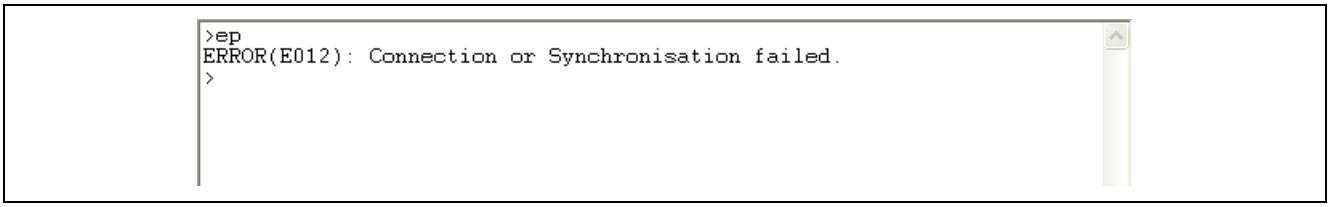


Figure A.3 Action Log Window

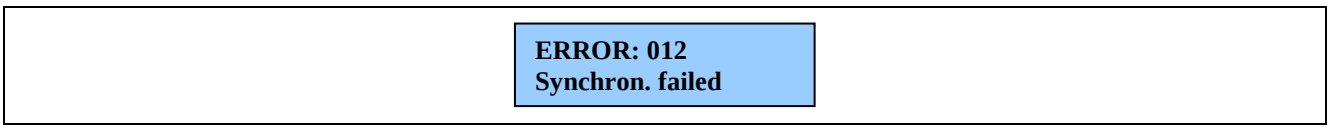


Figure A.4 Error Message FP5 Message Display

A.2. Error/Warning Dialog Boxes for Programming GUI Operation

(1)

No.	Message	Description
E 1100	Communication within host PC and FlashProgrammer is broken	An error occurred in communication between the host PC and the FP5. Check the cable connection and FP5 power supply.
E 1101	Can't setup communication within host PC and FlashProgrammer	Communication between the host PC and FP5 cannot be established. Check the cable connection and power supply. Moreover, check if the USB driver is installed correctly.
E 1102	Can't find parameter file	The specified PR5 file could not be found.
E 1103	Open parameter file failed	The specified PR5 file cannot be opened.
E 1105	Unable to open last active PRM/SET file. Using most recent settings.	The PR5/ESF file in the valid programming area cannot be opened. The latest setting will be used.
E 1106	Firmware is not valid or version is lower than requirement.	Incorrect version information or an old version was detected. Update the FP5 firmware.
E 1107	Parameter area format is not match with initial file. Do you want reset parameter area format?	The factor for dividing the programming area does not match the one defined in the INI file. Select whether to reset the division factor. If reset, it is divided into four areas and the contents are deleted.
E 1108	No invalid Parameter file defined. GUI can not work properly.	The GUI will not operate normally because no valid PR5 file has been defined. Set it in the Device Setup dialog box.
E 1109	No parameter file exists in this project folder. Please select parameter files.	There is no parameter file in user selected folder. GUI waited user to find out one or more parameter files in other folder.
E 1201	Invalid file.	The specified file cannot be opened. Set it in the Device Setup dialog box.
E 1202	<Setting file name> is not valid. Using most recent settings.	An incorrect format or value was detected in the ESF file. The ESF file defined in the INI file will be used instead. Set it in the Device Setup dialog box.
E 1203	<Parameter file name> is not valid. Using most recent settings.	An incorrect format or value was detected in the PR5 file. The ESF file defined in the INI file will be used instead. Set it in the Device Setup dialog box.
E 1204	Download of parameter file failed.	Downloading of the PR5 file has failed. The PR5 file may be invalid. Re-set the connection between the host PC and FP5.
E 1205	Download of setting file failed.	Downloading of the ESF file has failed. The ESF file may be invalid. Re-set the connection between the host PC and FP5.
E 1206	File name is not valid.	The specified file cannot be opened for writing. Make sure that the file attribute is not set to read-only.
E 1400	Password is invalid. Effective password consists one to eight any alphanumeric character. It is case insensitive.	Password contains invalid character or out of size range.
E 1401	The password does not match. [Yes]: Retry to input the password [No]: Initialize the password and format to the shipment condition.	Password is different with defined content.

(2)

No.	Message	Description
E 1501	This file is not valid.	The file opened with the HEX Editor is invalid.
E 1502	Caution: Data Flash access unit is DWORD.	The data flash area can be accessed in double-word units, but an access was attempted in unsupported units.
E 1503	Caution: Out of range!	The address range for saving data is out of the code flash or data flash address range. Check the start/end address.
E 1504	Caution: Start address should not larger than End address.	The start address is larger than the end address. Check the start/end address.
E 1505	Caution: End address should not smaller than start address.	The end address is smaller than the start address. Check the start/end address.
E 1506	The file cannot be read.	The file opened with the HEX Editor is invalid.
E 1507	No HEX data.	The program file format may be incorrect.
E 1508	The file cannot be written.	Saving of the program file has failed. Check if this file is occupied by another program.
E 1509	Temporary file could not be created.Abort	The temporary file cannot be created. Creation was aborted. Confirm that sufficient memory capacity is available in Windows.
E 1510	Can not open <file name> Abort	*<file-name>* cannot be opened.
E 1511	File load error. Abort	An error occurred during file reading or writing.
E 1512	Memory cannot be allocated.	Confirm that sufficient memory capacity is available in Windows.
E 1513	Memory reallocation error	Confirm that sufficient memory capacity is available in Windows.
E 1514	Check sum error. Continue?	It was detected that the checksum of the program file opened by the HEX editor was invalid. Click OK to continue checksum verification. Click Cancel to abort checksum verification.
E 1515	Cannot open <file name> Abort.	The program file specified by the HEX editor cannot be opened.
E 1516	Error line : <line number> Data error. Abort DATA Check	An illegal data exists in line *line-number* in the program file.
E 1517	Shortage of memory.	Confirm that sufficient memory capacity is available in Windows.
E 1518	Invalid file name.	The file name is invalid.
E 1519	HEX format error.	An illegal program file format was detected.
E 1520	Too large address.	The address is too large. The maximum address that can be used by the HEX Editor is 420000h.
E 1521	Can not run <command name>	Running of the *command-name* command has failed.
E 1522	Illegal address	The range of the data storage address is invalid. The start address may be larger than the end address.
E 1523	<file name> could not be opened. Abort Save File	*<file-name>* cannot be opened. File saving was aborted.
E 1524	Data error. Abort DATA Check	A data error has been found in the program file. Data checking was aborted.
E 1525	Temporary file could not be read. Abort Save File	Opening of the temporary file has failed. The file may be corrupted.

(3)

No.	Message	Description
E 1526	Error line : <line number> Data Count error. Abort "Data Count Check"	A data count error has occurred in line *line-number*. The program file format may be incorrect.
E 1527	Cannot open temporary file.	Opening of the temporary file has failed. The file may be corrupted.
E 1528	File Save error. Abort "Save File"	Saving the file has failed.
E 1529	<line number> Check sum error. Continue ?	A checksum error has occurred in line *line-number*. The program file format may be incorrect. Select whether to continue the operation.
E 1530	Too large address. Edit range: 0 - 0x420000	The program file address is too large. Set an address value in the range 0 to 420000h.
E 1531	Data Flash format error: <data address>: Invalid ID Tag.	The data flash format is invalid. Valid 4 bytes are followed by an ID tag of 4-byte FFh or 4-byte 00h in the data flash area. An error occurs if the ID tag includes defects, or FFh or 00h is included.
E 1532	Parameter of "Start Address" is invalid.	The value input as the start address is not a valid hexadecimal number.
E 1533	Parameter of "End Address" is invalid.	The value input as the end address is not a valid hexadecimal number.
E 1534	Temporary file could not be read. Abort Dump Hex	The temporary file cannot be read. Opening of the HEX Editor was aborted.
E 1535	Can not open <file name> Abort 'Dump Hex'	*<file-name>* cannot be opened. Opening of the HEX Editor was aborted.
E 1536	File load error. Abort 'Dump Hex'	A file load error. Opening of the HEX Editor was aborted.
E 1537	Error line : <line number > Check sum error. Abort "Check sum" Check	An incorrect checksum was detected in line *line-number* in the program file. The program file format may be incorrect.
E 1538	Can not read temporary file.	Reading of the temporary file has failed. The file may be corrupted.
E 1539	Caution: Out of range!	The specified value is out of the valid range.
E 1540	Caution: Failed input!	Input area is empty.
E 1601	Protect error.	The on-chip debug security ID and option byte settings cannot be read because read-prohibited has been specified.
E 1604	Invallid address found in HEX file: <file name >This file can not be used with command option 'minimum unit programming'	Message occurred when address defined in HEX file is out of range of parameter file defined.
E 1605	Invallid HEX file: <file name >This file can not be used with command option 'minimum unit programming'	Message occurred when HEX file has not valid. E.g. Wrong checksum or wrong data format inside HEX file.

A.3. Information Dialog Boxes for Programming GUI Operation

(1)

No.	Message	Description
I 2100	Please setup host connection again.	After FP5 reset, communication with FP5 was attempted but failed. Try [Programmer] - [Setup host connection] in the menu.
I 2200	Please open 'Setup' form menu. It will help you down load parameter & setting files	Open [Setup] in the menu and then download the PR5 or ESF file.
I 2207	Do you really want change parameter area format? All data will lost after this action	Select whether to change the factor for dividing the programming area. After this operation, all data will be lost.
I 2208	Information defined in initial file is not enough or it is not matched with FlashProgrammer. Setup parameters is needed.	The settings in the ESF file are insufficient or do not match the settings made in the FP5. Device setup is required.
I 2209	Information defined in initial file is not complete matched with FlashProgrammer. Do you want to go Setup dialog?	The contents of the ESF file do not match those stored in the FP5. Select whether to open the Device Setup dialog box.
I 2210	Updating the firmware will take several minutes. ATTENTION: - The process of updating your firmware must NOT be interrupted! - Without firmware this FP5 GUI will NOT run properly. Install new firmware in your programmer?	The firmware update will take several minutes. ATTENTION: Firmware update cannot be aborted. The FP5 may not operate normally if proper firmware is not installed. Select whether to update the firmware.
I 2211	Updating the FPGA will take several minutes. ATTENTION: - The process of updating your FPGA must NOT be interrupted! - Without FPGA this FP5 GUI will NOT run properly. Install new FPGA in your programmer?	The FPGA update will take several minutes. ATTENTION: The FP5 may not operate normally if a proper FPGA is not installed. Select whether to update the FPGA.
I 2212	You must be careful before start Self-test. ATTENTION: - Remove any plugs from Target- and Remote-connector before starting. - Any hardware attached to those connectors may be damaged by this test! Start Self-test?	Note the following points before performing self-testing. ATTENTION: Unplug all target connectors and remote connectors. If any hardware is connected, it may be damaged by this testing.
I 2213	Project folder and parameter file is not defined. Click button [Yes] if create the setting file newly Click button [No] if select the existing setting file	–
I 2214	Parameter setting file is not defined. use most recent setting as default	–
I 2215	Selected parameter files are copied to specified project folder.	User selected parameter files are copied to the destination.
I 2216	<*Parameter file name*> already exists. Do you want overwrites the existing file?	–
I 2218	HEX File on local PC differs from FlashProgrammer contents. Setup of parameters is needed.	The program file is not sufficient, or does not match the FP5. Setup of the device is required.

(2)

No.	Message	Description
I 2300	Value out of range.	The set value of file checksum command is out of the valid ranges. The valid code flash range is 0-0x400000. The valid data flash range is 0x400000 to 0x420000.
I 2301	Value out of range.	Start or end address defined for upload command is out of range. The valid code flash range is 0-0x400000. The valid data flash range is 0x400000 to 0x420000.
I 2302	Please give file range	Input the file range. No arguments are specified for the range.
I 2401	Caution: When 'Chip Erase' is disabled, chip cannot be erased and programmed any more!	If security setting is performed with chip erase prohibition enabled, the target device cannot be rewritten because chip erasure cannot be done.
I 2402	Caution: When 'Boot block cluster reprogramming' is disabled, chip cannot be erased and programmed any more!	If security setting is performed with boot area rewrite prohibition enabled, the boot area of the target device cannot be rewritten.
I 2403	Caution: When 'Block Erase' is disabled, chip cannot be erased and programmed any more!	If security setting is performed with block erase prohibition enabled, the target device cannot be rewritten because block erasure cannot be done.
I 2404	Caution: Configuration Clear can not be executed when all blocks are not blank. Continue?	Show message when ‘Configuration Clear after Erase’ checkbox is clicked.
I 2405	Caution: When ‘OTP’ is set, the block cannot be erased and programmed any more!	Show message when ‘Set OTP after Program’ checkbox is clicked.
I 2406	Caution: When Serial programming disable set, the device cannot be connected with Flash Programmer any more! Continue?	Show message when ‘Disable Serial Programmer’ checkbox is clicked.
I 2411	The selection is out of range.	The selected communication speed is higher than the maximum value defined in the PR5 file.
I 2412	The selection is out of range.	The selected communication speed is lower than the minimum value defined in the PR5 file.
I 2413	Value is out of range.	The selected clock value is larger than the maximum value defined in the PR5 file.
I 2414	Value is out of range.	The selected clock value is smaller than the minimum value defined in the PR5 file.
I 2415	The selection is out of range.	The V_{DD} value exceeds the range defined in the PR5 file.
I 2416	The selection is out of range.	The V_{DD2} value exceeds the range defined in the PR5 file.
I 2417	The selection is out of range.	The selected value is out of the valid range.
I 2418	Input data is out of range.	The selected clock value exceeds the range defined in the PR5 file.
I 2419	Caution: Boot Block swapping will not be possible with this selection. Anyhow, boot block protection is possible.	Boot swapping is not available because the selected block number is larger than half the total block numbers defined in the PR5 file. Boot block protection can be enabled.
I 2420	Illegal ID code setting.	The value in the [ID code] box is illegal.
I 2421	Illegal option byte setting.	The value in the [Option bytes setting] box is illegal.
I 2422	OFS setting invalid.	Setup/standard/OFS setting is wrong
I 2423	Illegal ID code for authentication	The value in the [ID] box is illegal.
I 2424	At least one block should be selected!	No blocks are selected in the [Operation Area]. Select at least one block to be the target for command execution.

(3)

No.	Message	Description
I 2500	Welcome to FP5 Manager! [Yes]:Continue to set FP5 Manager [No]:Return to Standard mode unsecured	–
I 2501	Initialize as shipment condition? Warning: After initialization all data and parameter settings in FP5 will be deleted.	–
I 2601	Buffer is modified. Are you sure to close?	The HEX Editor temporary file has been changed. This change is lost when the HEX Editor is closed.
I 2602	This file is not valid.	The file selected by the HEX Editor is invalid.
I 2603	End record not found, created.	The end record is missing. The HEX editor will add the HEX format end record ':00000001FF' to the file.
I 2604	Save?	Select whether to save the data. Click 'Ok' to save the data. Click 'Cancel' to not save the data.
I 2605	The file is modified. Are you sure to quit?	The file has been modified. Select whether to abort the operation. Click 'Yes' to abort without saving changes. Click 'No' to continue the operation.
I 2606	The file is modified. Save file?	The file has been modified. Select whether to save changes.

A.4. Error Messages Displayed in FP5 Message Display

(1)

No.	Message	Error Condition	Possible Workaround
001	Invalid PRM data	Invalid PRM data	The parameter file may include invalid data, or the file may be defective. Perform setting again by using the correct PR5 file.
002	Not connected	No device connected to FP5	Issue a 'con' command before the command causing this error.
005	Not supported!	–	The command issued is not supported on the device and thus cannot be used. Check if the target device to be connected has been selected.
006	Command aborted!	Command aborted	The [Read] command has been canceled.
008	Parameter Error!	PR5 file Error	The parameter file may be damaged.
011	Read. Sig failed	Device signature reading failed	Check if the correct device is selected.
012	Check connection	Connection check	The FP5 cannot establish connection to the target device. The cause may be a wrong connection between the device and the FP5, bad socket contacts or the oscillator not operating.
013	Addr. Range err	Address range error	The address given in the command exceeds the device's address range.
014	RDY detect. fail	Device does not send RDY signal.	Wrong connection between device and FP5 or bad socket contacts.
015	Freq. set failed	Setting the Oscillator frequency failed.	Check if the oscillator frequency is allowed. If yes, contact Renesas Electronics support desk.
016	Baudrt. set fail	Setting the communication baud rate failed.	Unsupported baud rate specified. Please consult the device manual.
017	ID coe chk. err	ID code does not match.	Set the security ID specified for the target device.
018	Lockbit dis. err	Error occurs in Lock bit disable command.	A communication problem occurred between the FP5 and target device. Try the operation again. Or, the device may be damaged.
019	Lockbit ena. err	Error occurs in Lockbit enable command.	A communication problem occurred between the FP5 and target device. Try the operation again. Or, the device may be damaged.
020	Inv. Sig. ID	Invalid signature ID	Check if the correct device is selected.
021	Inv. Sig. Code	Invalid signature code	Check if the correct device is selected.
022	Inv. Sig. func.	Invalid signature function	Check if the correct device is selected.
023	Inv. Sig. addr.	Invalid signature address	Check if the correct device is selected.
024	Inv. device name	Invalid device name	Check if the correct device is selected.
025	Inv. Signature	Invalid signature	Check if the correct device is selected.
026	Inv Dev/Firm ver	Invalid device firmware version	Check if the correct device is selected.
027	Unkn. Signature	Unknown Signature	Check, if the correct PRM file is used.
029	Inv. DeviceInfo	Invalid device information	Check if the correct device is selected.
030	Prewrite Timeout	Prewrite timed out	A communication problem occurred between the FP5 and target device. Try the operation again.
032	Prewrite failed	Prewrite retry error	The device may be damaged.
036	ICU mode err	Comm error during ICU mode check command.	A communication problem occurred between the FP5 and target device. Try the operation again. Or, the device may be damaged.

(2)

No.	Message	Error Condition	Possible Workaround
040	Erase Timeout	Erase timed out	A communication problem occurred between the FP5 and target device. Try the operation again.
041	Erase failure	Erase failed	The device may be damaged.
042	Ers time exceed	Erase timed out	The device may be damaged.
043	Ers Timeset err	Erase time setting error	The PR5 file may contain invalid data. Contact Renesas Electronics.
051	Blank chk failed	Blank check failed	The device connected is not empty. Use the 'erase' command before programming.
050	Bln Timeout	Blank check timed out	A communication problem occurred between the FP5 and target device. Try the operation again.
060	Wrb Timeout	Writeback timed out	There was a communication problem between the FP5 and target device. Or the device may be defective.
061	Writeback failed	Writeback failed	A device defect is most probably causing this error.
062	Wrb retry exceed	Writeback retry timed out	A device defect is most probably causing this error.
063	Wrb Timeset err	Writeback time setting error	The parameter file may contain invalid data. Contact Renesas Electronics.
070	Write timeout	Write timed out	There was a communication problem between the FP5 and target device. Try the operation again.
071	Write failed	Write operation failed	Either the device was not blank before writing or a device defect is causing this error.
072	Write retry err	Write retry error	Either the device was not blank before writing or a device defect is causing this error.
073	Wrt. Timeset err	Write time setting error	The parameter file may contain invalid data. Contact Renesas Electronics.
080	Vrf Timeout	Verify timed out	There was a communication problem between the FP5 and target device. Try the operation again.
081	Verify failed	Verify failed	The data in the target device's flash memory is not the same as in the FP5.
090	IVrf Timeout	Internal verify timed out	There was a communication problem between the FP5 and target device. Try the operation again.
091	IVerify failed	Internal verify error	An error was occurred while the write data level was being checked.
092	VGT Comm err	Device communication error	The FP5 is not communicating properly with the target device. Check that the FP5 is correctly connected to the target device.
093	SUM Comm err	Device communication error	The FP5 is not communicating properly with the target device. Check that the FP5 is correctly connected to the target device.
094	SCF Comm err	Device communication error	The FP5 is not communicating properly with the target device. Check that the FP5 is correctly connected to the target device. It is displayed when security setting is changed from prohibition to permission. Set security setting to permission by chip erasure.
095	GSC Comm err	An error occurred during execution of the Security Get command	The FP5 is not communicating properly with the target device. Check that the FP5 is correctly connected to the target device.

(3)

No.	Message	Error Condition	Possible Workaround
096	CLR Comm err	Error occurs in Configuration Clear command.	A communication problem occurred between the FP5 and target device. Try the operation again. Or, the device may be damaged.
099	READ Comm err	Device communication error	It is a problem of communication between the FP5 and target device. Improve the connection environment between the FP5 and the device. It is displayed when read prohibition is set in security setting. Set read permission by chip erasure.
204	Not connected	–	The target device was not connected to FP5 when a 'dcon' command was issued.
210	Already conn.	–	A 'con' command was issued when the target device was already connected to FP5.
301	Security ID err	Security ID does not match.	Set the security ID specified for the target device.
302	HEX range err	Program file size error	The address range of the downloaded program file is outside the address range set in the [Operation Mode] area on the [Standard] tab of the Device Setup dialog box.
303	Invalid ID Tag	–	The format of the ID Tag is not correct. Download the correct file.
400	Targ. power det.	Target power detected! Check Setup.	FP5 should supply V_{DD} power, but supply voltage has been detected to be already present on the target board. Please change Setup (uncheck: V_{DD}: On Target).
401	FP5 int Vpp fail	FP5 Power failure.	Please contact Renesas Electronics support desk.
402	FP5 int Vdd fail	FP5 Power failure.	Please contact Renesas Electronics support desk.
403	FP5 int Vdd2 fail	FP5 Power failure.	Please contact Renesas Electronics support desk.
404	Targ. power fail	No V_{DD} applied or Voltage is out of range.	V_{DD} is supplied from target board, but V_{DD} voltage does not match the V_{DD} value in FP5 Setup. Check, if the V_{DD} power settings are OK.
405	Power failure	A supply voltage failure has been detected.	There is possibly a shortcut in the target hardware.
585	GOB Comm err	An error occurred during execution of the Option bytes get command.	The FP5 is not communicating properly with the target device. Check that the FP5 is correctly connected to the target device.
586	GID Comm err	An error occurred during execution of the ID Code get command.	The FP5 is not communicating properly with the target device. Check that the FP5 is correctly connected to the target device.
587	SLB Comm err	An error occurred during execution of the Ser Lock Bit command.	The FP5 is not communicating properly with the target device. Check that the FP5 is correctly connected to the target device.
588	GOT Comm err	Error occurs in OTP get command.	A communication problem occurred between the FP5 and target device. Try the operation again. Or, the device may be damaged.
589	GLB Comm err	Error occurs in Lock bit get command.	A communication problem occurred between the FP5 and target device. Try the operation again. Or, the device may be damaged.
590	IDC Comn err	Device communication error or illegal ID code	The FP5 is not communicating properly with the target device. Check that the FP5 is correctly connected to the target device. Also check that the ID code is correct.
591	OPB Comn err	Device communication error or illegal Option bytes	The FP5 is not communicating properly with the target device. Check that the FP5 is correctly connected to the target device. Also check that the Option bytes is correct.

(4)

No.	Message	Error Condition	Possible Workaround
592	OTP Comm err	Comm error during OTP set command.	A communication problem occurred between the FP5 and target device. Try the operation again. Or, the device may be damaged.
593	SID Comm err	Comm error during Serial programming ID code set command.	A communication problem occurred between the FP5 and target device. Try the operation again. Or, the device may be damaged.
594	OFS Comm err	Comm error during OFS set command or OFS get command.	A communication problem occurred between the FP5 and target device. Try the operation again. Or, the device may be damaged.
595	SED Comm err	Comm error during Endian set command.	A communication problem occurred between the FP5 and target device. Try the operation again. Or, the device may be damaged.
596	GED Comm err	Comm error during Endian get command.	A communication problem occurred between the FP5 and target device. Try the operation again. Or, the device may be damaged.
597	SPD Comm err	Comm error during Serial Programming Disable command.	A communication problem occurred between the FP5 and target device. Try the operation again. Or, the device may be damaged.
598	ICU Comm err	Comm error during ICU command.	A communication problem occurred between the FP5 and target device. Try the operation again. Or, the device may be damaged.

APPENDIX B SUPPLEMENTARY INFORMATION

This chapter covers supplementary information referred to by the user's manual of the FP5.

<HEX Editor>

address	+0 +1 +2 +3 +4 +5 +6 +7 +8 +9 +A +B +C +D +E +F	ID Tag
400000	00 11 22 33 44 55 66 77 88 99 AA BB CC DD EE FF	1 1 0 0

<Saved program file>

address	Data Flash	ID Tag	Data Flash	ID Tag
400000h	00 11 22 33	FF FF FF FF	44 55 66 77	FF FF FF FF
400010h	88 99 AA BB	00 00 00 00	CC DD EE FF	00 00 00 00

Figure B.1 Relationship Between HEX Editor and Saved Program File

```
/* The generator polynomial used for this table is */
/* x^32+x^26+x^23+x^22+x^16+x^12+x^11+x^10+x^8+x^7+x^5+x^4+x^2+x^1+x^0 */
/* according to Autodin/Ethernet/ADCCP protocol standards */
/* Binary: 0x04c11db7 */

const u32 CRC32_Tab [256]= {
0x00000000, 0x04c11db7, 0x09823b6e, 0x0d4326d9, 0x130476dc, 0x17c56b6b, 0x1a864db2, 0x1e475005,
0x2608edb8, 0x22c9f00f, 0x2f8ad6d6, 0x2b4bcb61, 0x350c9b64, 0x31cd86d3, 0x3c8ea00a, 0x384fbdbd,
0x4c11db70, 0x48d0c6c7, 0x4593e01e, 0x4152fda9, 0x5f15adac, 0x5bd4b01b, 0x569796c2, 0x52568b75,
0x6a1936c8, 0x6ed82b7f, 0x639b0da6, 0x675a1011, 0x791d4014, 0x7ddc5da3, 0x709f7b7a, 0x745e66cd,
0x9823b6e0, 0x9ce2ab57, 0x91a18d8e, 0x95609039, 0x8b27c03c, 0x8fe6dd8b, 0x82a5fb52, 0x8664e6e5,
0xbe2b5b58, 0xbaea46ef, 0xb7a96036, 0xb3687d81, 0xad2f2d84, 0xa9ee3033, 0xa4ad16ea, 0xa06c0b5d,
0xd4326d90, 0xd0f37027, 0xddb056fe, 0xd9714b49, 0xc7361b4c, 0xc3f706fb, 0xceb42022, 0xca753d95,
0xf23a8028, 0xf6fb9d9f, 0xfbb8bb46, 0xff79a6f1, 0xe13ef6f4, 0xe5ffeb43, 0xe8bccd9a, 0xec7dd02d,
0x34867077, 0x30476dc0, 0x3d044b19, 0x39c556ae, 0x278206ab, 0x23431b1c, 0x2e003dc5, 0x2ac12072,
0x128e9dcf, 0x164f8078, 0x1b0ca6a1, 0x1fcdbb16, 0x018aeb13, 0x054bf6a4, 0x0808d07d, 0x0cc9cdca,
0x7897ab07, 0x7c56b6b0, 0x71159069, 0x75d48dde, 0x6b93dddb, 0x6f52c06c, 0x6211e6b5, 0x66d0fb02,
0x5e9f46bf, 0x5a5e5b08, 0x571d7dd1, 0x53dc6066, 0x4d9b3063, 0x495a2dd4, 0x44190b0d, 0x40d816ba,
0xaca5c697, 0xa864db20, 0xa527fdf9, 0xa1e6e04e, 0xbfa1b04b, 0xbb60adfc, 0xb6238b25, 0xb2e29692,
0x8aad2b2f, 0x8e6c3698, 0x832f1041, 0x87ee0df6, 0x99a95df3, 0x9d684044, 0x902b669d, 0x94ea7b2a,
0xe0b41de7, 0xe4750050, 0xe9362689, 0xedf73b3e, 0xf3b06b3b, 0xf771768c, 0xfa325055, 0xfef34de2,
0xc6bcf05f, 0xc27dede8, 0xcf3ecb31, 0xcbffd686, 0xd5b88683, 0xd1799b34, 0xdc3abded, 0xd8fba05a,
0x690ce0ee, 0x6dcdfd59, 0x608edb80, 0x644fc637, 0x7a089632, 0x7ec98b85, 0x738aad5c, 0x774bb0eb,
0x4f040d56, 0x4bc510e1, 0x46863638, 0x42472b8f, 0x5c007b8a, 0x58c1663d, 0x558240e4, 0x51435d53,
0x251d3b9e, 0x21dc2629, 0x2c9f00f0, 0x285e1d47, 0x36194d42, 0x32d850f5, 0x3f9b762c, 0x3b5a6b9b,
0x0315d626, 0x07d4cb91, 0x0a97ed48, 0x0e56f0ff, 0x1011a0fa, 0x14d0bd4d, 0x19939b94, 0x1d528623,
0xf12f560e, 0xf5ee4bb9, 0xf8ad6d60, 0xfc6c70d7, 0xe22b20d2, 0xe6ea3d65, 0xeba91bbc, 0xef68060b,
0xd727bbb6, 0xd3e6a601, 0xdea580d8, 0xda649d6f, 0xc423cd6a, 0xc0e2d0dd, 0xcda1f604, 0xc960ebb3,
0xbd3e8d7e, 0xb9ff90c9, 0xb4bcb610, 0xb07daba7, 0xae3afba2, 0xaafbe615, 0xa7b8c0cc, 0xa379dd7b,
0x9b3660c6, 0x9ff77d71, 0x92b45ba8, 0x9675461f, 0x8832161a, 0x8cf30bad, 0x81b02d74, 0x857130c3,
0x5d8a9099, 0x594b8d2e, 0x5408abf7, 0x50c9b640, 0x4e8ee645, 0x4a4ffbf2, 0x470cdd2b, 0x43cdc09c,
0x7b827d21, 0x7f436096, 0x7200464f, 0x76c15bf8, 0x68860bfd, 0x6c47164a, 0x61043093, 0x65c52d24,
0x119b4be9, 0x155a565e, 0x18197087, 0x1cd86d30, 0x029f3d35, 0x065e2082, 0x0b1d065b, 0x0fdc1bec,
0x3793a651, 0x3352bbe6, 0x3e119d3f, 0x3ad08088, 0x2497d08d, 0x2056cd3a, 0x2d15ebe3, 0x29d4f654,
0xc5a92679, 0xc1683bce, 0xcc2b1d17, 0xc8ea00a0, 0xd6ad50a5, 0xd26c4d12, 0xdf2f6bcb, 0xdbee767c,
0xe3a1cbc1, 0xe760d676, 0xea23f0af, 0xeee2ed18, 0xf0a5bd1d, 0xf464a0aa, 0xf9278673, 0xfde69bc4,
0x89b8fd09, 0x8d79e0be, 0x803ac667, 0x84fbdbd0, 0x9abc8bd5, 0x9e7d9662, 0x933eb0bb, 0x97ffad0c,
0xafb010b1, 0xab710d06, 0xa6322bdf, 0xa2f33668, 0xbcb4666d, 0xb8757bda, 0xb5365d03, 0xb1f740b4
};

u32 CRC_accum=0xffffffff;

void Gen_CRC_Sum_Char (u08 c)
{
s32 i;

/* Ignore '=', SPACE, CR, LF */
if ((c == '=') || (c == ' ') || (c == '\r') || (c == '\n'))
return;

/* Perform CRC sum algorithm (use table for better speed) */
i= ((CRC_accum >> 24) ^ (u32) c) & 0xff;
CRC_accum= (CRC_accum << 8) ^ CRC32_Tab [i];
}
```

Figure B.2 32-bit CRC Calculation Specifications

```
----------------------------
Thu Aug 02 14:11:46 2007

------Start record file------
>ep
Blank check Chip:
ERROR(E051): Not blank, Erase needed.
Erase Chip:
PASS
Program Chip:
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
PASS
Erase,Program operation finished.
>
------End record file------
>
Thu Aug 02 14:12:03 2007

--------------------------
```

Figure B.3 Log File Example

```
#define BLOCKSIZ 256

/* You have to store 1-Block ROM data. */
unsigned char rom_data[BLOCKSIZ];

unsigned char
bist_calc()
{
        int i;
        unsigned short bist, bist_temp;

        bist = 0;
        for(i = 0; i < BLOCKSIZ; i++){
                bist_temp = bist & 0x1;
                bist_temp = (bist_temp << 8) | (bist_temp << 9) |
                                        (bist_temp << 11) | (bist_temp << 12);
                bist = (bist >> 1) ^ rom_data[i] ^ bist_temp;
        }
        return((unsigned char)bist);
}
```

Figure B.4 Division (Original) Calculation Specifications

```
/* The generator polynomial used for this table is: */
/* x^16+x^12+x^5+x^0 according to CCITT-16 standard. */
/* Binary: 0x1021 */
const uint16_t CRC16_Tab [256]= {
    0x0000,0x1021,0x2042,0x3063,0x4084,0x50A5,0x60C6,0x70E7,
    0x8108,0x9129,0xA14A,0xB16B,0xC18C,0xD1AD,0xE1CE,0xF1EF,
    0x1231,0x0210,0x3273,0x2252,0x52B5,0x4294,0x72F7,0x62D6,
    0x9339,0x8318,0xB37B,0xA35A,0xD3BD,0xC39C,0xF3FF,0xE3DE,
    0x2462,0x3443,0x0420,0x1401,0x64E6,0x74C7,0x44A4,0x5485,
    0xA56A,0xB54B,0x8528,0x9509,0xE5EE,0xF5CF,0xC5AC,0xD58D,
    0x3653,0x2672,0x1611,0x0630,0x76D7,0x66F6,0x5695,0x46B4,
    0xB75B,0xA77A,0x9719,0x8738,0xF7DF,0xE7FE,0xD79D,0xC7BC,
    0x48C4,0x58E5,0x6886,0x78A7,0x0840,0x1861,0x2802,0x3823,
    0xC9CC,0xD9ED,0xE98E,0xF9AF,0x8948,0x9969,0xA90A,0xB92B,
    0x5AF5,0x4AD4,0x7AB7,0x6A96,0x1A71,0x0A50,0x3A33,0x2A12,
    0xDBFD,0xCBDC,0xFBBF,0xEB9E,0x9B79,0x8B58,0xBB3B,0xAB1A,
    0x6CA6,0x7C87,0x4CE4,0x5CC5,0x2C22,0x3C03,0x0C60,0x1C41,
    0xEDAE,0xFD8F,0xCDEC,0xDDCD,0xAD2A,0xBD0B,0x8D68,0x9D49,
    0x7E97,0x6EB6,0x5ED5,0x4EF4,0x3E13,0x2E32,0x1E51,0x0E70,
    0xFF9F,0xEFBE,0xDFDD,0xCFFC,0xBF1B,0xAF3A,0x9F59,0x8F78,
    0x9188,0x81A9,0xB1CA,0xA1EB,0xD10C,0xC12D,0xF14E,0xE16F,
    0x1080,0x00A1,0x30C2,0x20E3,0x5004,0x4025,0x7046,0x6067,
    0x83B9,0x9398,0xA3FB,0xB3DA,0xC33D,0xD31C,0xE37F,0xF35E,
    0x02B1,0x1290,0x22F3,0x32D2,0x4235,0x5214,0x6277,0x7256,
    0xB5EA,0xA5CB,0x95A8,0x8589,0xF56E,0xE54F,0xD52C,0xC50D,
    0x34E2,0x24C3,0x14A0,0x0481,0x7466,0x6447,0x5424,0x4405,
    0xA7DB,0xB7FA,0x8799,0x97B8,0xE75F,0xF77E,0xC71D,0xD73C,
    0x26D3,0x36F2,0x0691,0x16B0,0x6657,0x7676,0x4615,0x5634,
    0xD94C,0xC96D,0xF90E,0xE92F,0x99C8,0x89E9,0xB98A,0xA9AB,
    0x5844,0x4865,0x7806,0x6827,0x18C0,0x08E1,0x3882,0x28A3,
    0xCB7D,0xDB5C,0xEB3F,0xFB1E,0x8BF9,0x9BD8,0xABBB,0xBB9A,
    0x4A75,0x5A54,0x6A37,0x7A16,0x0AF1,0x1AD0,0x2AB3,0x3A92,
    0xFD2E,0xED0F,0xDD6C,0xCD4D,0xBDAA,0xAD8B,0x9DE8,0x8DC9,
    0x7C26,0x6C07,0x5C64,0x4C45,0x3CA2,0x2C83,0x1CE0,0x0CC1,
    0xEF1F,0xFF3E,0xCF5D,0xDF7C,0xAF9B,0xBFBA,0x8FD9,0x9FF8,
    0x6E17,0x7E36,0x4E55,0x5E74,0x2E93,0x3EB2,0x0ED1,0x1EF0
};

uint16_t CalcMemoryCRC16 (uint32_t address, uint32_t length)
{
    uint32_t i, rd_ptr;
    uint16_t crc_accum;
    uint8_t byte, data [4];

    crc_accum= 0x0000;   /* Init Pattern */
    for (i= 0, rd_ptr= 0; i < length; i++)
    {
        /* Check flash read buffer and fill if needed */
        if (rd_ptr == 0)
        {
            Memory_Read (address, 4, data);
            rd_ptr= 4;
            address+= 4;
        }
        byte= (crc_accum >> 8) ^ data [--rd_ptr];
        crc_accum= (crc_accum << 8) ^ CRC16_Tab [byte];
    }
    return crc_accum;
}
```

Figure B.5 16-bit CRC Calculation Specifications

APPENDIX C ELECTRICAL SPECIFICATIONS OF TARGET INTERFACE

This chapter explains the electrical specifications of target interface.

C.1. Absolute Maximum Ratings (T_A=0 to 40°C)

Pin name	Symbol	Parameter or Conditions	Ratings	Unit
V_{DD} V_{DD2}	–	Input supply voltage	−0.5 to +6.8	V
V_{PP}	V_O	Output supply voltage	−0.5 to +13	V
FLMD0 FLMD1 RESET SI/RxD SO/TxD SCK H/S CLK RFU-1 VDE	V_I	Input voltage	−0.5 to +V_{DD}+0.5 V[Note]	V
V_{DD} V_{DD2} V_{PP}	I_O	Output current	+500	mA
FLMD0 FLMD1 RESET SI/RxD SO/TxD SCK H/S CLK	I_I	Input current (−0.5 V<V_I< V_{DD}+0.5 V)	±20	mA
	I_O	Output current (0.3 V<V_O<V_{DD}+0.5 V)	±35	mA
	T_A	Operating ambient temperature	0 to 40	°C
	T_{stg}	Storage temperature	−15 to +60	°C

Note Must be less than 6.8 V.

Note Product quality may suffer if the absolute maximum rating is exceeded even momentarily for any parameter. That is, the absolute maximum ratings are rated values at which the product is on the verge of suffering physical damage, and therefore the product must be used under conditions that ensure that the absolute maximum ratings are not exceeded.

C.2. DC Characteristics (T_A=0 to 40°C)

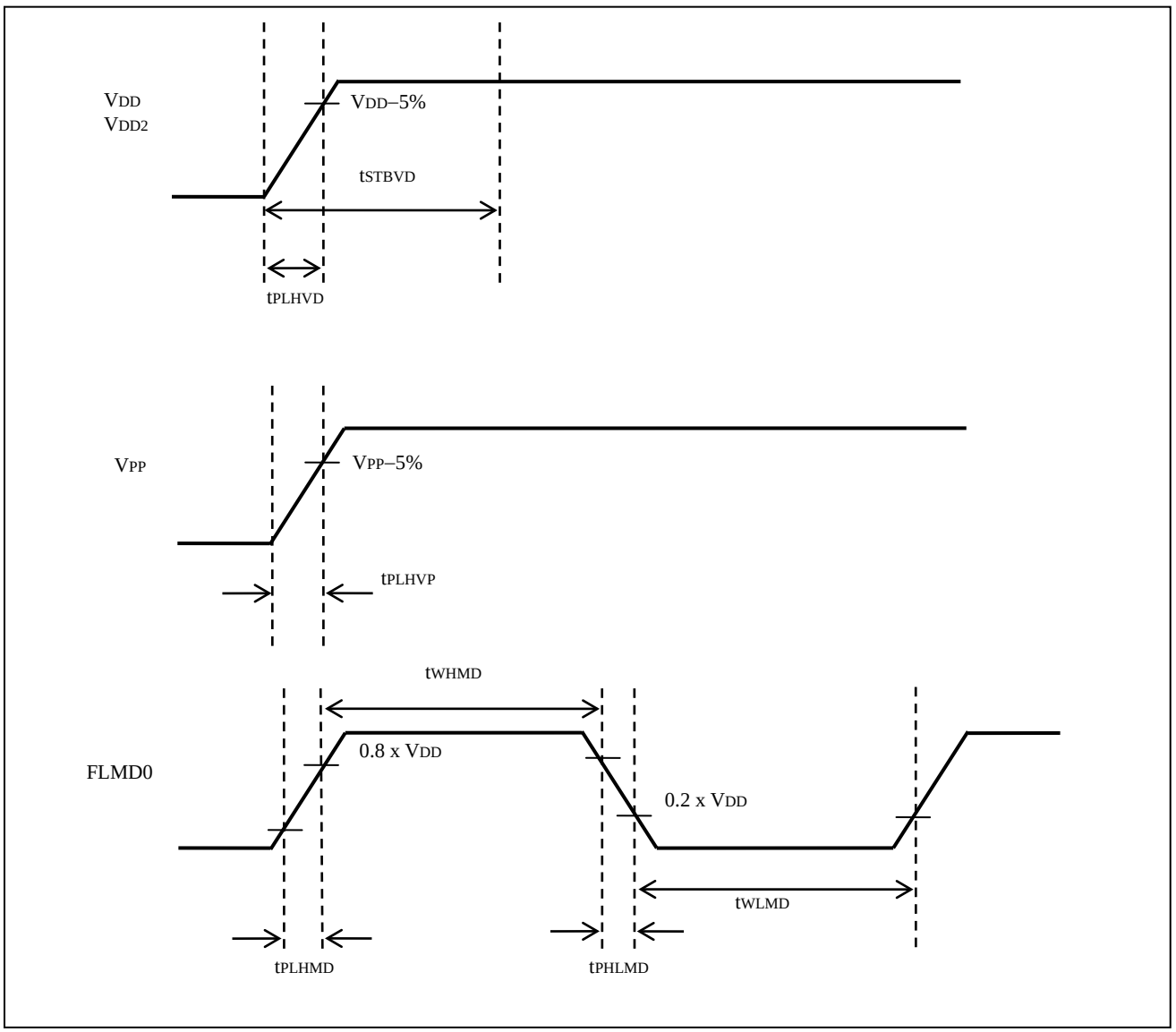
Pin name	Symbol	Parameter or Conditions	MIN.	TYP.	MAX.	Unit
V_{DD} V_{DD2}	V_{OH}	Output voltage, high	1.2		5.5	V
		Output voltage accuracy, high (I_{OH}=100mA)	V_{DD}–5%	VDD	V_{DD}+5%	V
V_{PP}	V_{OL}	Output voltage, low	0		5.5	V
	V_{OH}	Output voltage, high	1.2		12	V
FLMD0 FLMD1 RESET SO/TxD SCK CLK	V_{OL1}	Output voltage, low (I_{OL}=100μA)		0	0.2	V
	V_{OL2}	Output voltage, low (V_{DD}=3.0V, I_{OL}=8mA)		0.5	0.7	V
	V_{OL3}	Output voltage, low (V_{DD}=4.5V, I_{OL}=16mA)		0.9	1.1	V
	V_{OH1}	Output voltage, high (I_{OH}=100μA)	V_{DD} – 0.2	V_{DD}		V
	V_{OH2}	Output voltage, high (V_{DD}=3.0V, I_{OH}=8mA)	2.1	2.6		V
	V_{OH3}	Output voltage, high (V_{DD}=4.5V, I_{OH}=16mA)	3.1	3.7		V
SI/RxD H/S	I_{IL}	Input voltage, low			V_{DD}×0.30	V
	I_{IH}	Input voltage, high	V_{DD}×0.75			V
V_{DD} V_{DD2}	I_{OH1}	Output current, high (V_{DD}=1.2V)			+100	mA
	I_{OH2}	Output current, high (V_{DD}=3.3V)			+300	mA
	I_{OH3}	Output current, high (V_{DD}=5.0V)			+350	mA
	I_{IH}	Input current, high			+10	mA
V_{PP}	I_{OH}	Output current, high			+200	mA
FLMD0 FLMD1 RESET SO/TxD SCK H/S CLK	I_{OL}	Output current, low			–16	mA
	I_{OH}	Output current, high			+16	mA
SI/RxD H/S	I_{LIL}	Input leakage current, low			–10	μA
	I_{LIH}	Input leakage current, high			+100	μA

C.3. AC Characteristics (T_A=0 to 40°C, C=0pF (Unloaded Condition))

(1)

Pin name	Symbol	Parameter or Conditions	MIN.	TYP.	MAX.	Unit
V_{DD} V_{DD2}	t_{PLHVD}	Rise time (V_{DD}=5.0V, I_{OH}=200mA)			300	μs
		Rise time (V_{DD}=3.3V, I_{OH}=200mA)			700	μs
	t_{STBVD}	V_{DD}/V_{DD2} stabilization time			200	ms
V_{PP}	t_{PHLVP}	Rise time			5	μs
FLMD0	t_{PLHMD}	Rise time			20	ns
	t_{PHLMD}	Fall time			20	ns
	t_{WHMD}	High-level width	Note	50	Note	μs
	t_{WLMD}	Low-level width	Note	50	Note	μs

Note The minimum value (MIN.) and the maximum value (MAX.) are determined depend on parameter file. (MIN.=1μs, MAX.=999×10^9μs)



(2)

Pin name	Symbol	Parameter or Conditions	MIN.	TYP.	MAX.	Unit
RESET	t_{PLHRS}	Rise time (C=0pF)	20			ns
	t_{DRS}	Reset release maximum delay time			Note	ns

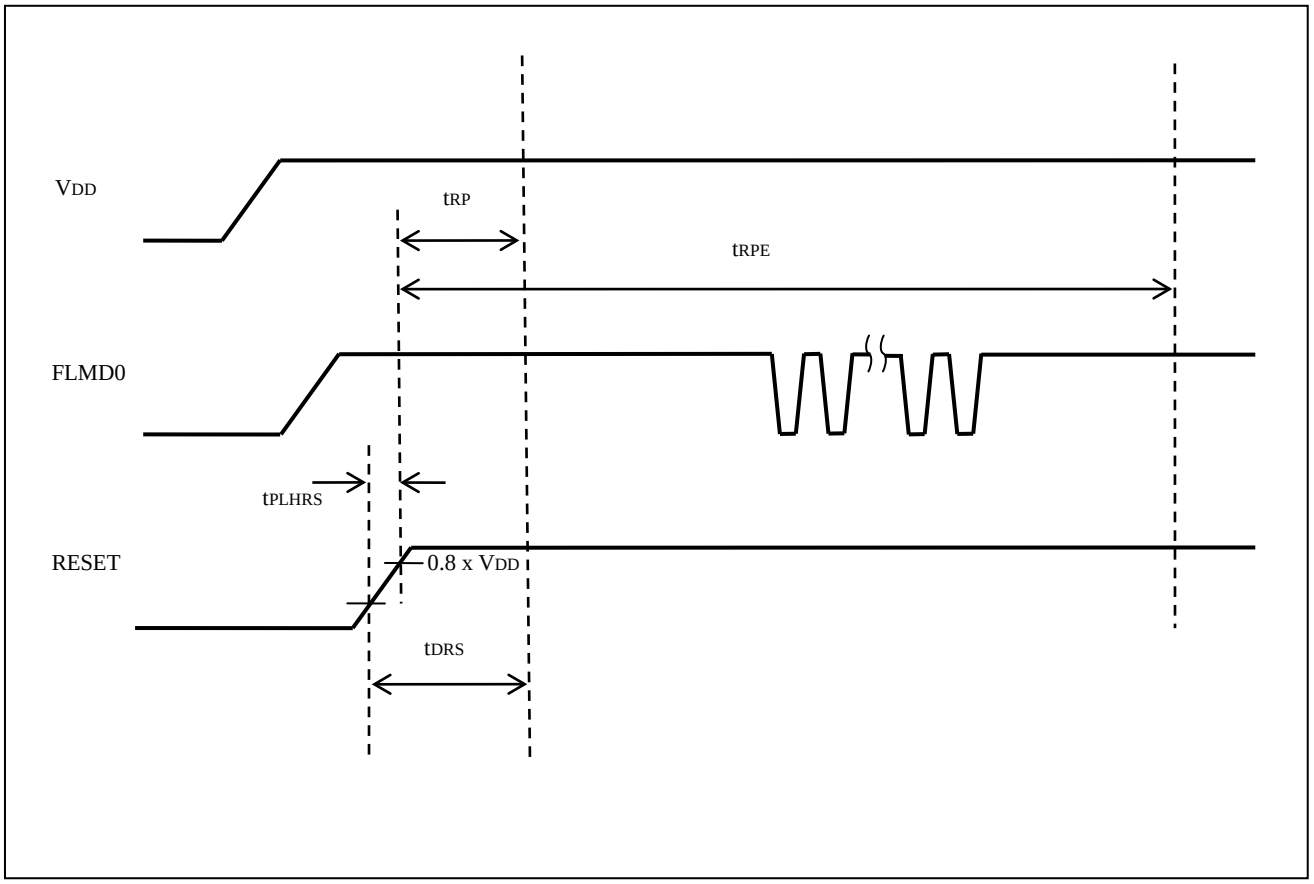
Note $(t_{RPE}-t_{RP}) / 2 - FLMD0 \times 100\ \mu s$

t_{RP} : Device firmware FLMD0 Count start time

t_{RPE} : Device firmware FLMD0 Count finish time

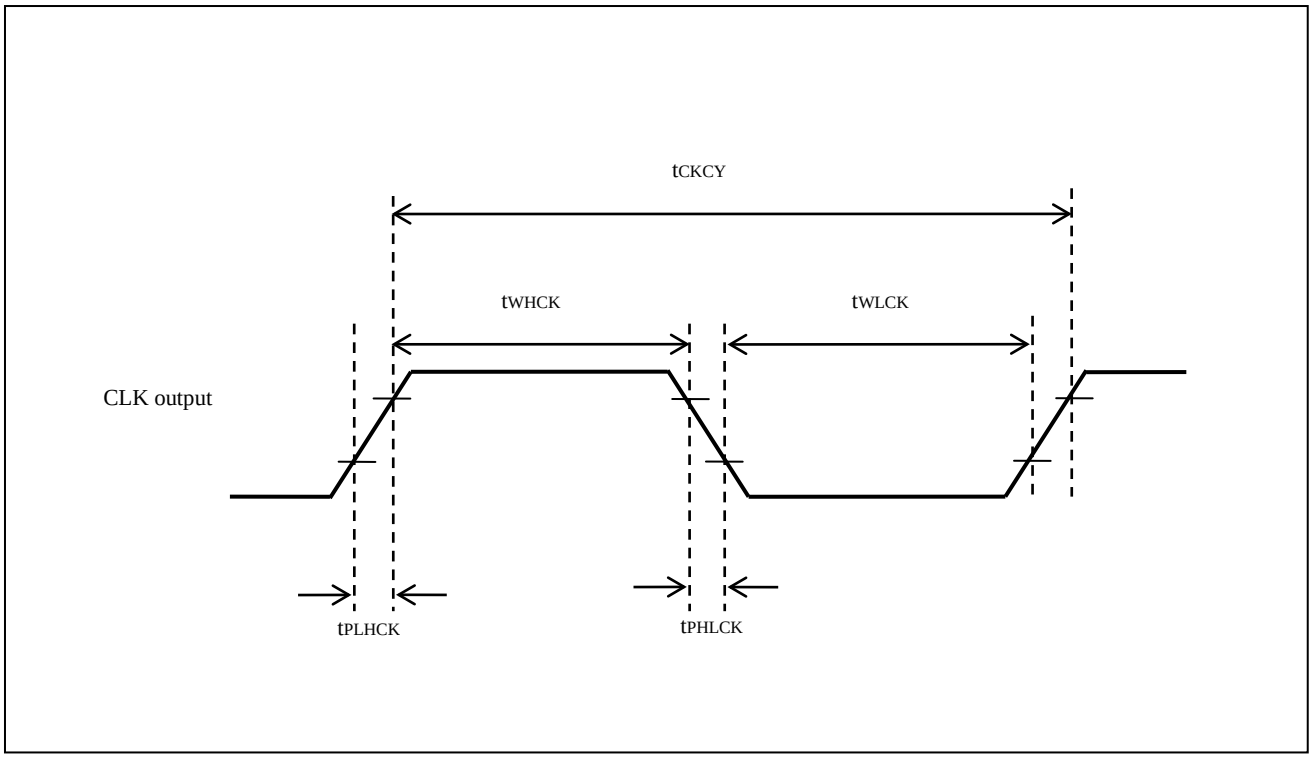
The maximum number of FLMD pulses is 15.

For the characteristics of t_{RP}, t_{RPE}, and FLMD0 pulses, refer to the parameter specifications in the manual of the target manual.



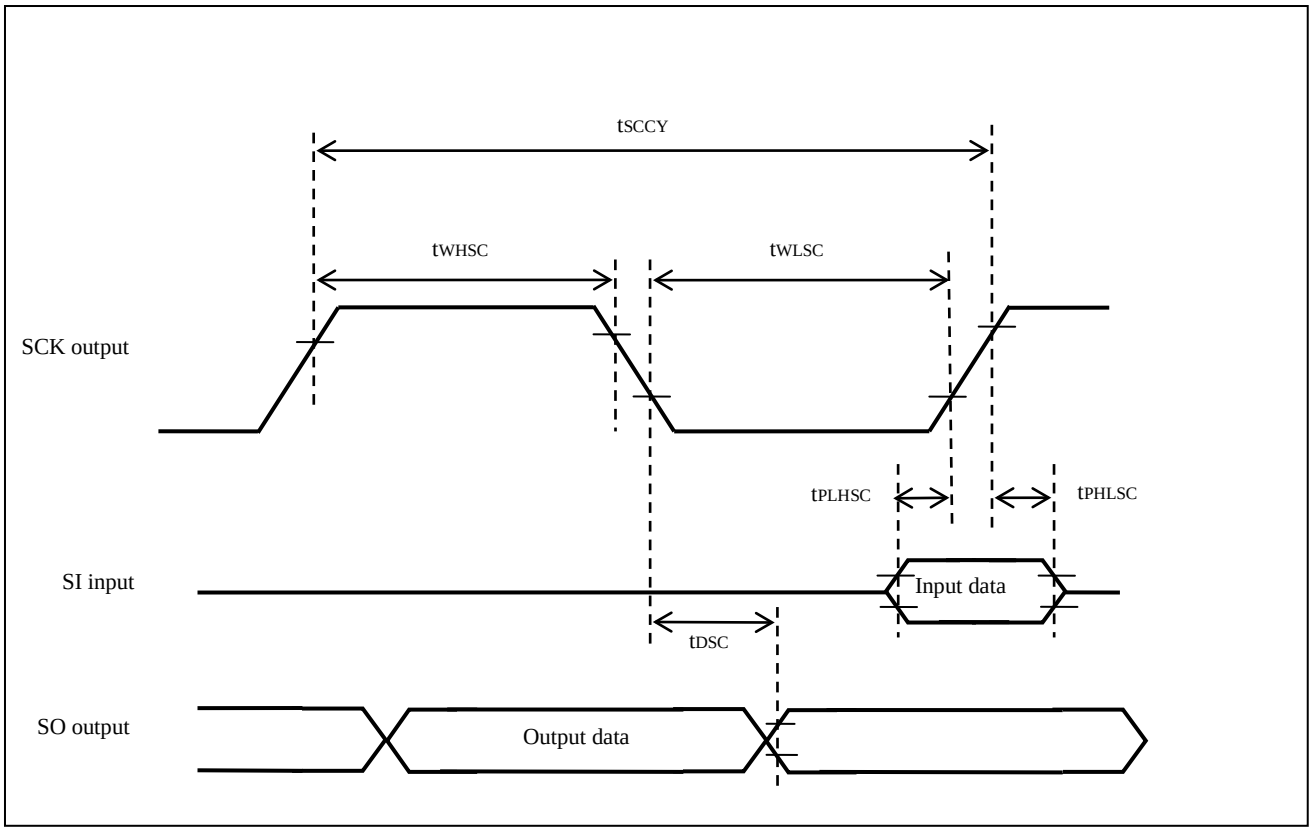
C.3.1. CLK output characteristics (T_A=0 to 40°C, C=0pF (unloaded condition))

Pin name	Symbol	Parameter or Conditions	MIN.	TYP.	MAX.	Unit
CLK	t_{CKCY}	Clock output frequency	1		20	MHz
	t_{WHCK}	High-level width	10.0		490	ns
	t_{WLCK}	Low-level width	10.0		490	ns
	t_{PLHCK}	Rise time	3.4		16	ns
	t_{PHLCK}	Fall time	4.2		12	ns



C.3.2. Serial transfer timing (T_A=0 to 40°C, C=0pF (unloaded condition))

Pin name	Symbol	Parameter or Conditions	MIN.	TYP.	MAX.	Unit
SCK	t_{SCCY}	Serial clock output frequency	9.8		5000	kHz
	t_{WHSC}	High-level width	85		50000	ns
	t_{WLSC}	Low-level width	85		50000	ns
	t_{PLHSC}	SI setup time (to SCK↑)	80			ns
	t_{PHLSC}	SI hold time (from SCK↑)	0			ns
	t_{DSC}	Delay time from SO output			20	ns
		Transfer rate in UART	9600		1000	kbps


tSCCY
tWHSC
tWLSC
SCK output
tPLHSC
tPHLSC
SI input
Input data
tDSC
SO output
Output data

APPENDIX D ELECTRICAL SPECIFICATIONS OF REMOTE INTERFACE

This chapter explains the electrical specifications of remote interface.

D.1. Absolute Maximum Ratings (T_A=0 to 40°C)

Pin name	Symbol	Parameter or Conditions	Ratings	Unit
CONN BUSY PASS ERROR CANCEL ENTER NEXT VRF START CLEAR	V_O	Output supply voltage	−0.5 to +3.6	V
	V_I	Input voltage	−0.5 to +6.0	V
	I_O	Output current (0V≤V_O≤3.6V)	±35	mA
		Output current (−0.5V≤V_O<0V)	−50	mA
	I_{IK}	Input current (V_I <0V)	−20	mA

Note Product quality may suffer if the absolute maximum rating is exceeded even momentarily for any parameter. That is, the absolute maximum ratings are rated values at which the product is on the verge of suffering physical damage, and therefore the product must be used under conditions that ensure that the absolute maximum ratings are not exceeded.

D.2. DC Characteristics (T_A=0 to 40°C, C=0pF (Unloaded Condition))

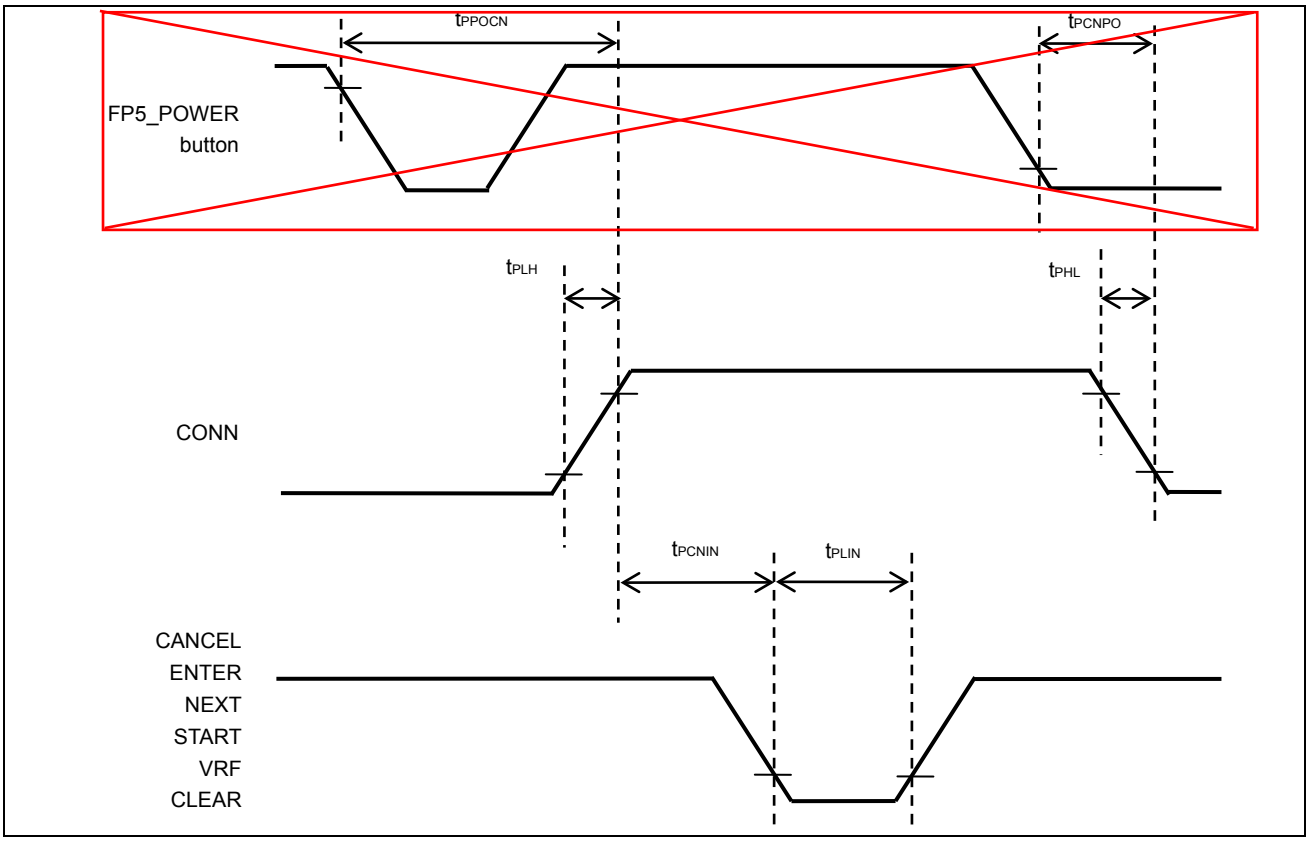
Pin name	Symbol	Parameter or Conditions	MIN.	TYP.	MAX.	Unit
CONN BUSY PASS ERROR	V_{OH}	Output voltage, high (I_{OH}=8mA)	2.3	2.9		V
		Output voltage, high (I_{OH}=50μA)	3.0	3.3		V
	V_{OL}	Output voltage, low (I_{OL}=8mA)		0.5	0.8	V
		Output voltage, low (I_{OH}=50μA)		0	0.1	V
CANCEL ENTER NEXT VRF START CLEAR	V_{IH}	Input voltage, high	2.2			V
	V_{IL}	Input voltage, low			1.1	V
CONN BUSY PASS ERROR	I_{OH}	Output current, high			+8	mA
	I_{OL}	Output current, low			−8	mA
CANCEL ENTER NEXT VRF START CLEAR	I_I	Input current			±1	mA

D.3. AC Characteristics (T_A=0 to 40°C, C=0pF (Unloaded Condition))

D.3.1. Standard mode

(1)

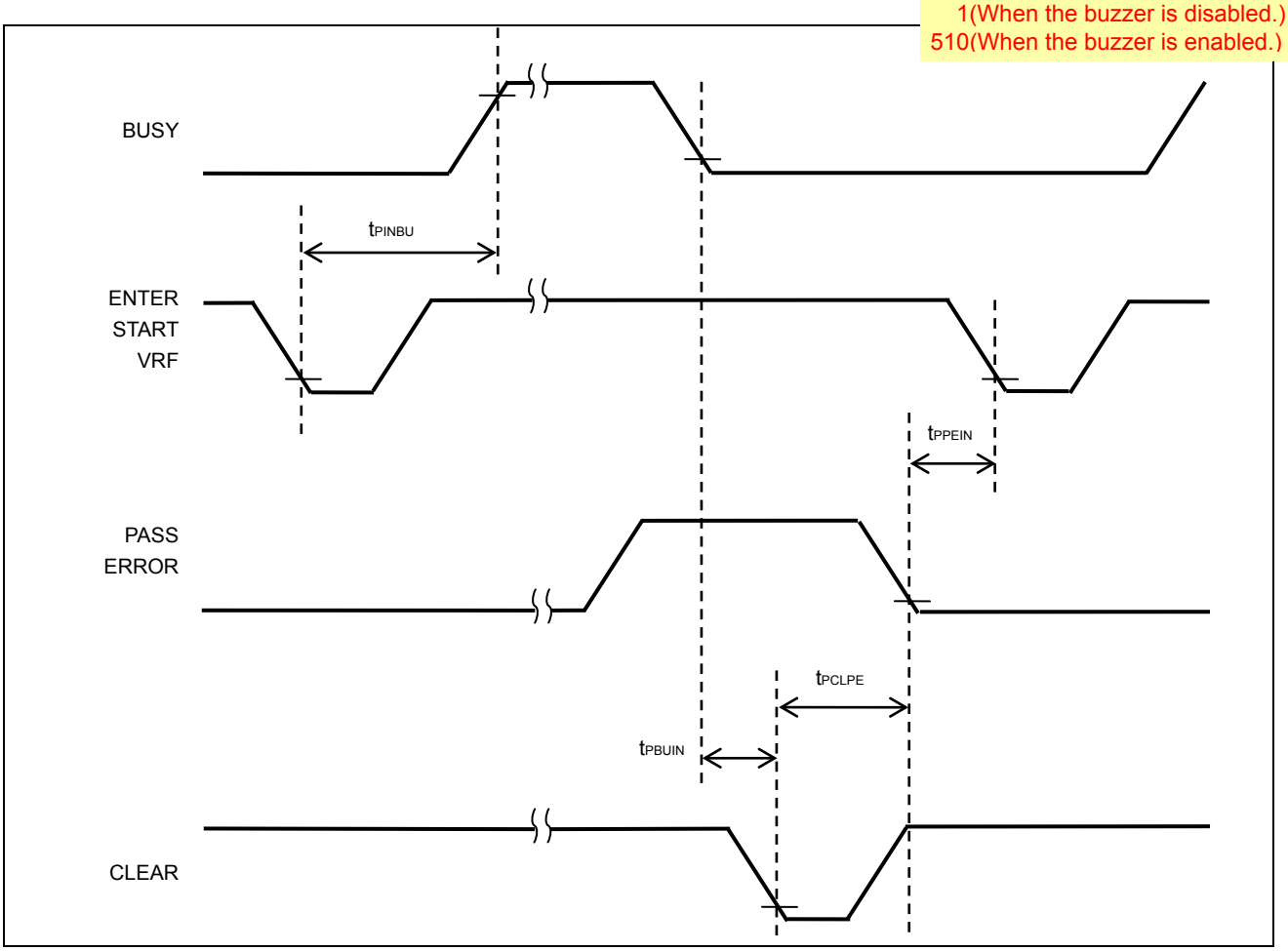
Pin name	Symbol	Parameter or Conditions	MIN.	TYP.	MAX.	Unit
CONN BUSY PASS ERROR	t_{PLH}	Rise time (I_O=8mA)	~~5~~		5	ns
	t_{PHL}	Fall time (I_O=8mA)	~~5~~		5	ns
CANCEL ENTER NEXT VRF START CLEAR	t_{PLIN}	Low-level width of input signal	50			ms
	~~t_{PPOCN}~~	~~Time from switching on the FP5 POWER button until the rise of the CONN signal~~			~~8~~	~~s~~
	~~t_{PCNPO}~~	~~Time from switching off the FP5 POWER button until the fall of the CONN signal~~			~~1~~	~~s~~
	t_{PCNIN}	Time from the rise of the CONN signal until the input signal is acknowledged	1			ms



(2)

Pin name	Symbol	Parameter or Conditions	MIN.	TYP.	MAX.	Unit
	t_{PINBU}	Time from the fall of the VRF, START, or ENTER signal until the rise of the BUSY signal	~~50~~		50	ms
	t_{PBUIN}	Time from the fall of the BUSY signal until the CLEAR signal can be input	~~1~~			ms
	t_{PCLPE}	Time from the fall of the CLEAR signal until the fall of the PASS or ERROR signal	~~50~~		50	ms
	t_{PPEIN}	Time from the fall of the PASS or ERROR signal until the VRF, START, or ENTER signal can be input	~~1~~		1	ms

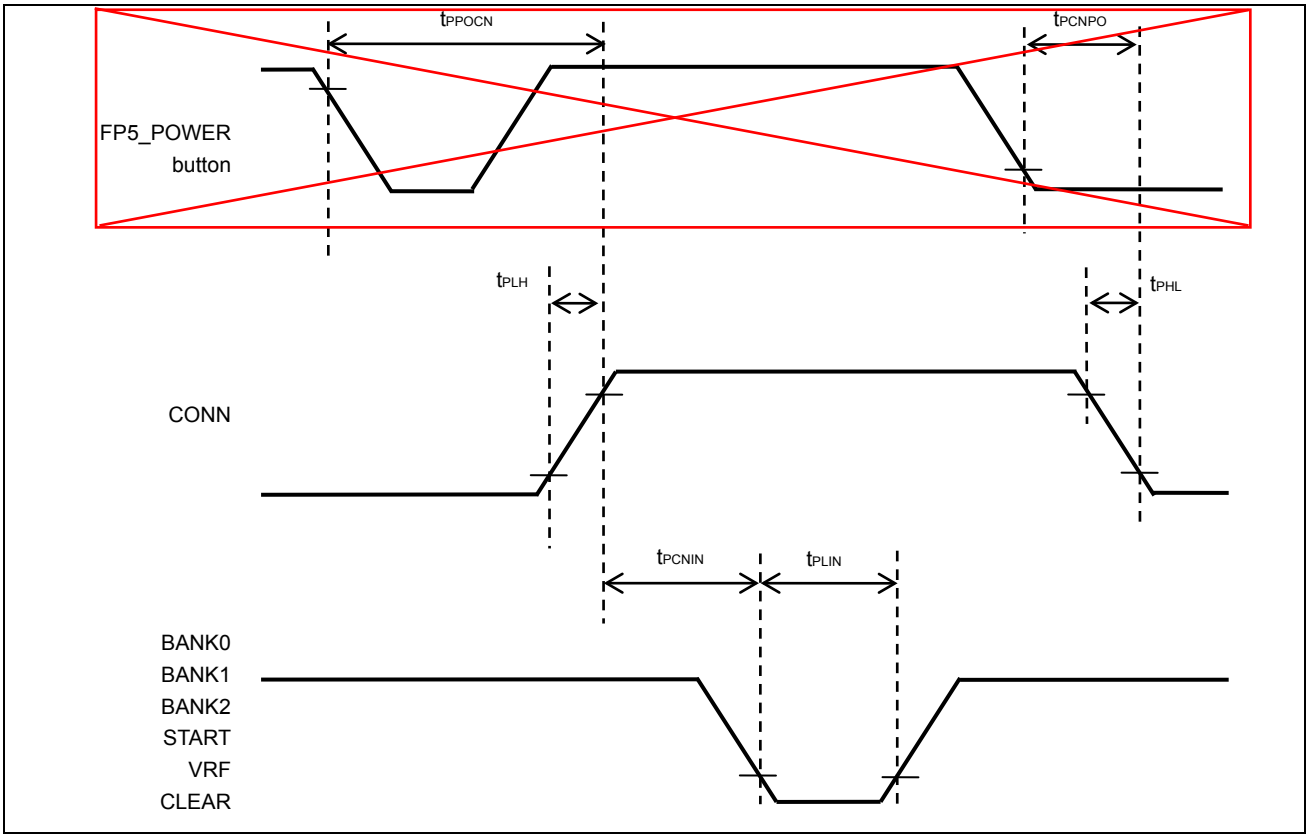
1(When the buzzer is disabled.)
510(When the buzzer is enabled.)



D.3.2. Bank mode

(1)

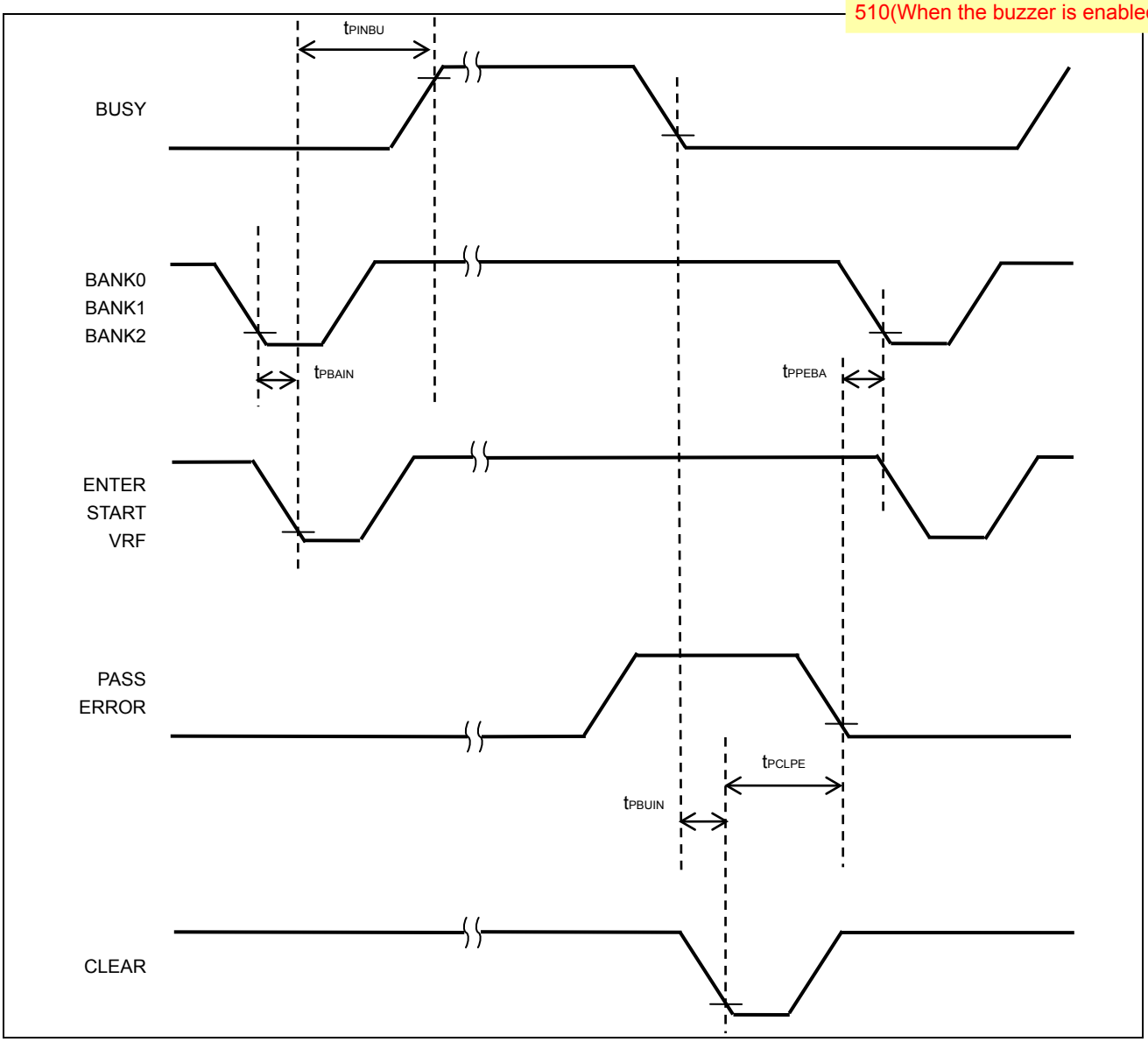
Pin name	Symbol	Parameter or Conditions	MIN.	TYP.	MAX.	Unit
CONN BUSY PASS ERROR	t_{PLH}	Rise time (I_O=8mA)	~~5~~		5	ns
	t_{PHL}	Fall time (I_O=8mA)	~~5~~		5	ns
BANK0 BANK1 BANK2 VRF START CLEAR	t_{PLIN}	Low-level width of input signal	50			ms
	~~t_{PPOCN}~~	~~Time from switching on the FP5 POWER button until the rise of the CONN signal~~			~~8~~	~~s~~
	~~t_{PCNPO}~~	~~Time from switching off the FP5 POWER button until the fall of the CONN signal~~			~~1~~	~~s~~
	t_{PCNIN}	Time from the rise of the CONN signal until the input signal is acknowledged	1			ms



(2)

Pin name	Symbol	Parameter or Conditions	MIN.	TYP.	MAX.	Unit
	t_{PBAIN}	Time from the fall of the BANK signal until the VRF or START signal can be input	1			ms
	t_{PINBU}	Time from the fall of the VRF, START or ENTER signal until the rise of the BUSY signal	~~100~~		100	ms
	t_{PBUIN}	Time from the fall of the BUSY signal until the CLEAR signal can be input	~~5~~			ms
	t_{PCLPE}	Time from the fall of the CLEAR signal until the fall of the PASS or ERROR signal	~~50~~		50	ms
	t_{PPEBA}	Time from the fall of the PASS or ERROR signal until the BANK signal can be input	10			ms

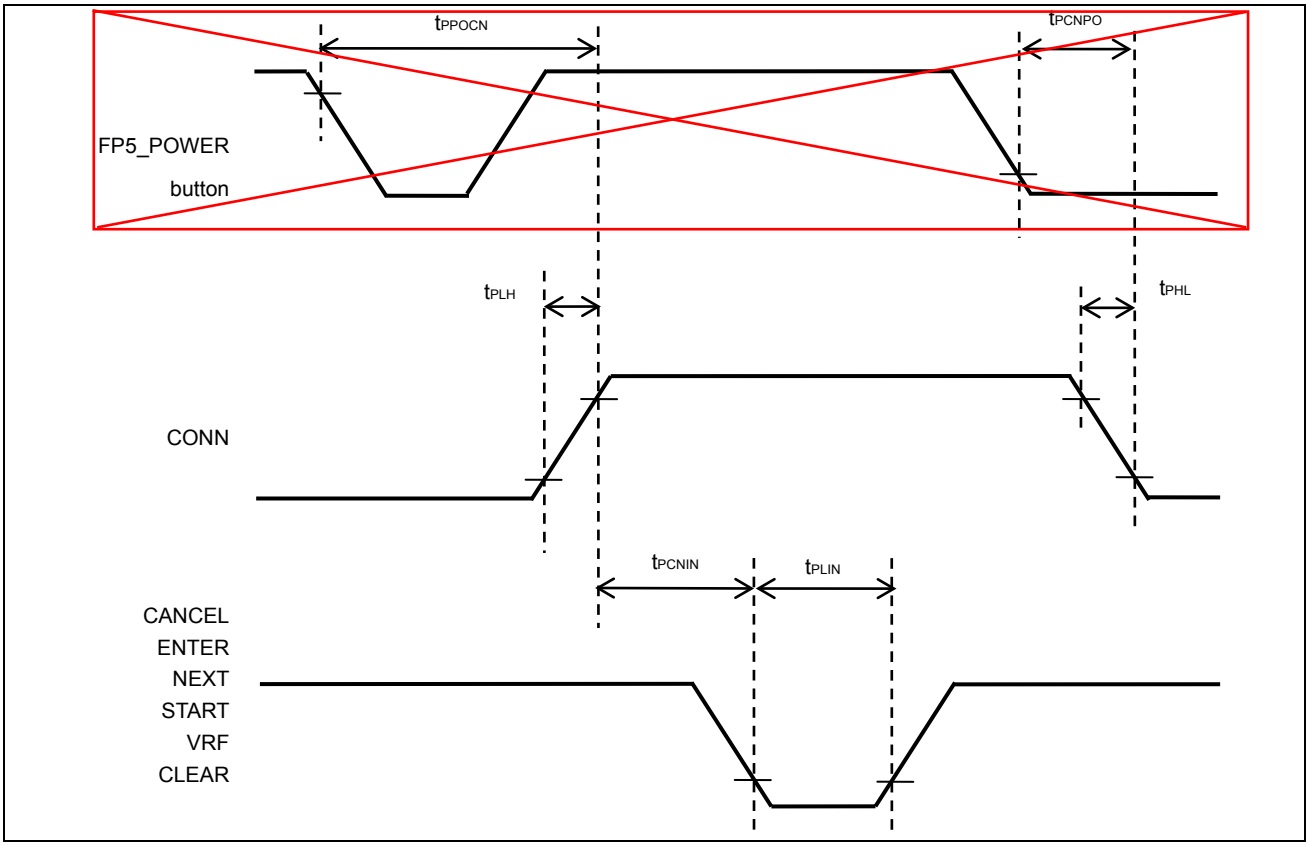
5(When the buzzer is disabled.)
510(When the buzzer is enabled.)



D.3.3. Simple mode

(1)

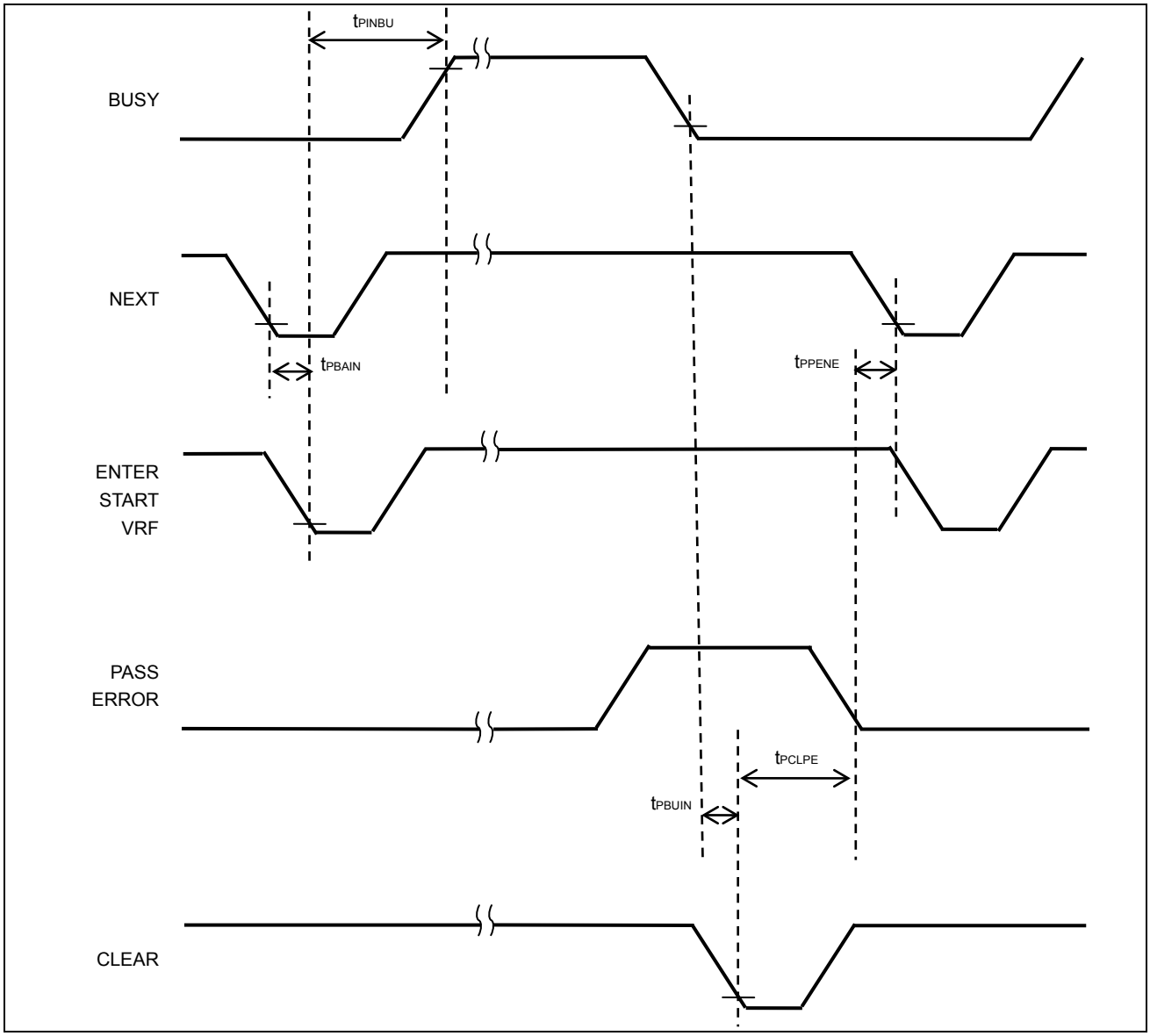
Pin name	Symbol	Parameter or Conditions	MIN.	TYP.	MAX.	Unit
CONN BUSY PASS ERROR	t_{PLH}	Rise time (I_O=8mA)	~~5~~		5	ns
	t_{PHL}	Fall time (I_O=8mA)	~~5~~		5	ns
CANCEL ENTER NEXT VRF START CLEAR	t_{PLIN}	Low-level width of input signal	50			ms
	~~t_{PPOCN}~~	~~Time from switching on the FP5 POWER button until the rise of the CONN signal~~			~~15~~	~~s~~
	~~t_{PCNPO}~~	~~Time from switching off the FP5 POWER button until the fall of the CONN signal~~			~~1~~	~~s~~
	t_{PCNIN}	Time from the rise of the CONN signal until the input signal is acknowledged	1			ms



(2)

Pin name	Symbol	Parameter or Conditions	MIN.	TYP.	MAX.	Unit
	t_{PBAIN}	Time from the fall of the NEXT signal until the VRF or START signal can be input	1			ms
	t_{PINBU}	Time from the fall of the VRF, START or ENTER signal until the rise of the BUSY signal (When the input signal is input after having changed the program area)	~~5~~		8	~~ms~~ s
		Time from the fall of the VRF, START or ENTER signal until the rise of the BUSY signal (When the input signal is input without changing the program area)	~~50~~		50	ms
	t_{PBUIN}	Time from the fall of the BUSY signal until the CLEAR signal can be input	~~1~~			ms
	t_{PCLPE}	Time from the fall of the CLEAR signal until the fall of the PASS or ERROR signal	~~50~~		50	ms
	t_{PPENE}	Time from the fall of the PASS or ERROR signal until the NEXT signal can be input	1			ms

1(When the buzzer is disabled.)
510(When the buzzer is enabled.)


tPINBU
BUSY
NEXT
tPBAIN
tPPENE
ENTER
START
VRF
PASS
ERROR
tPCLPE
tPBUIN
CLEAR

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